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Timken Plant for Heat-Treating Axles

Round Furnaces with Revolving Hearths
and Other Special Equipment for Reduc-
ing Costs—Producer Gas Used for Fuel

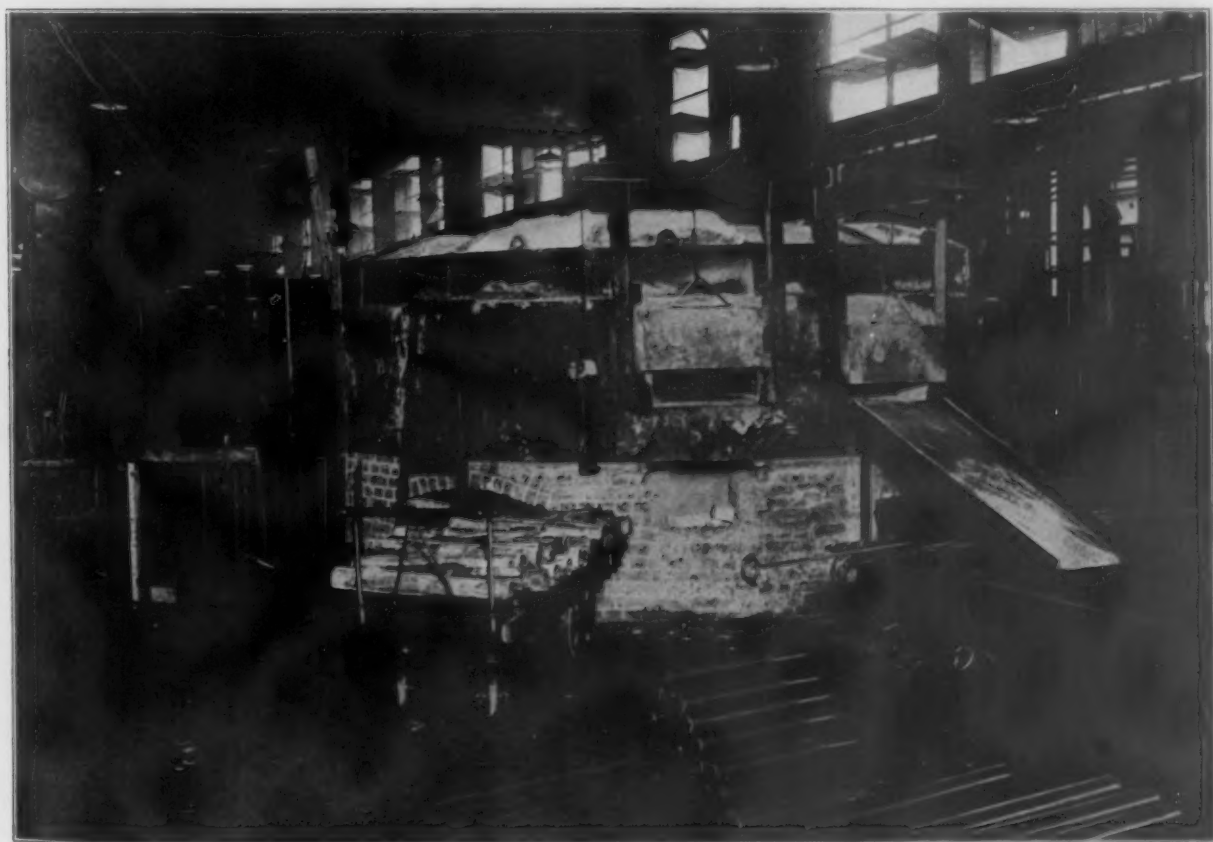
A HEAT-TREATING plant in which furnaces and other equipment of an interesting type, designed to meet special requirements and to reduce the cost of work, was recently built by the Timken-Detroit Axle Co., Detroit. One of the interesting features of this plant is the use of producer gas for firing the furnaces. Several of the heating furnaces are now fired with this gas and the remainder are being gradually changed over from fuel oil to producer gas.

The plant is designed for quality heat-treating work on the variety of parts that are used in the manufacture of an automobile axle. This includes the annealing, hardening and tempering of forgings, of parts made from shafting and small steel bars, and in fact the heat treating of all the parts that when assembled make an axle, except the steel and malleable castings.

Departing from the usual practice of having

the heat-treating plant located in a special building with a high monitor roof with windows directly above for carrying out the heat and gases, the heat-treating department occupies a room with a 25½-ft. ceiling in the first floor of a three-story building, directly under a machine shop. Because of this location window space for ventilation is limited to swinging sash in the sidewalls and a mechanical system of ventilation is required. The heat-treating department occupies floor space 250 ft. long and 60 ft wide. The building itself is 397 ft. long, the remaining floor space at one end being occupied by a blacksmith shop.

Along the sidewalls at one end of the plant is a battery of five producer-gas-fired carbonizing furnaces. A special feature of these furnaces is that the hearths are on the floor level for convenience in charging the carbonizing pots into the furnaces, all lifting of pots being thus eliminated. The furnaces



Circular continuous heat-treating furnaces with revolving hearths are used. The furnace is charged through a door at the left and the parts are drawn from the door at the right. Small parts are raked to the chute and fall by gravity into the quenching tank

are of the recuperative type and have 5 x 5 ft. hearths. Two of these were supplied by the W. S. Rockwell Co., and the remainder were built by the Timken company. The pots, which are of various shapes, including square and round, are charged into the furnace with a long-handled forked two-wheeled truck. Chimney pots are used for gears to provide uniform heating conditions and are cooled under asbestos lined sheet metal hoods located along one side of the room near the furnaces. These hoods have doors swinging down at the front so that the pots are entirely inclosed beneath the hoods while cooling. By following this practice the parts are cooled in a temperature that is practically uniform the year round instead of being exposed to all kinds of weather and varying temperature conditions by cooling them out of doors, and as the rapidity of cooling is uniform a uniform hardness is secured.

Some of the work is quenched at the carbonizing temperature. In that case the pots, instead of going under the cooling hood, are dumped over a grating conveniently located in front of the furnaces. The carbonizing compound drops through the grating into a receptacle beneath and the parts to be hardened are raked from the grating into a quenching tank, the top of which is on a level with the floor. There are two of these quenching tanks, one for oil, and the other for water, one on each side of the grating. The practice is to quench in the tanks if possible, but this cannot be done with parts of certain sizes and shapes, and those liable to distortion when cooled quickly. A mixing machine is used for mixing old and new carbonizing compound. Although this machine was built

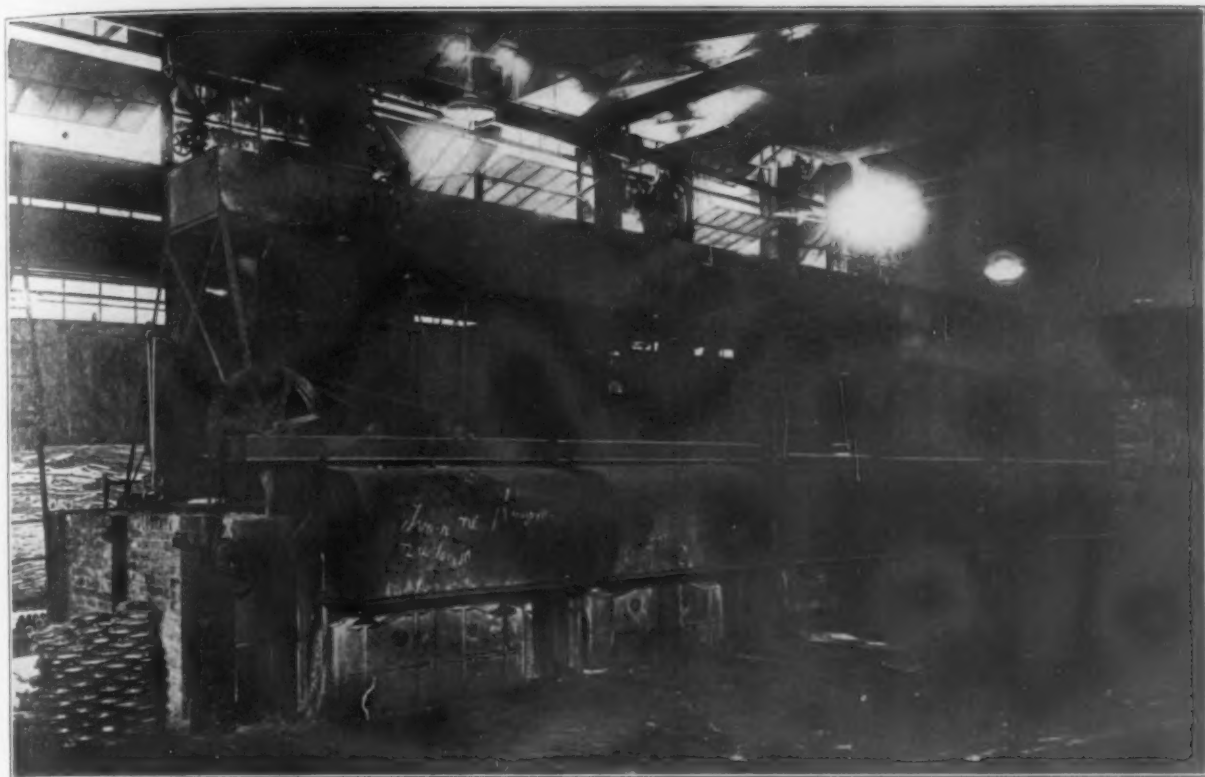
for other materials it is found satisfactory for the use to which it is put.

A hood extending down to the door is provided in front of each carbonizing furnace for carrying away the heat which passes into a rectangular exhaust flue above the back of each furnace. The heat from the furnace chamber also passes up through this exhaust flue. These flues connect with a large horizontal pipe that extends from over the tops of the furnaces and around the wall to the opposite side of the building where the hot air is exhausted by fans. The main exhaust pipe also passes above the cooling hoods to which it is similarly connected and the heat is drawn from these hoods. In addition to the mechanical exhaust system connected to the furnaces other equipment is provided for ventilating the room through a system of piping and large outlets directly beneath the ceiling. Hot air is exhausted from the furnaces and from the room by five American Blower Co. exhaust fans, two of these being located in the heat-treating department and three on the roof. The air supply for the furnaces and for the forges in the blacksmith shop is furnished by three General Electric centrifugal blowers, two having a capacity of 2000 cu. ft. of free air per min., each at 2-lb. pressure, and one with a capacity of 500 cu. ft. of air per min. at the same pressure. Air is supplied to the furnaces at a 2-oz. pressure.

The heat-treating furnaces are of a special continuous type designed by the company. These are circular furnaces with revolving hearths. The outside diameter of the furnace is 16 ft., and the outside diameter of the hearth 166 in. The revolving hearth, which is similar in form to a large washer,



Pinions are hardened in a quenching bench in which the gears are immersed in oil and the shanks are allowed to cool in the air, the localized hardening operation eliminating the necessity of afterward annealing the shanks were they brought to the hardness of the gears. Gears and pinions are heated in molten lead in the pot furnaces shown



The hearths of the carbonizing furnaces are on the floor level, eliminating the lifting of the carbonizing pots. A forked truck, used for charging the furnaces, is shown in the foreground. This illustration also shows the hoods in front of the furnaces and the flues and pipes above for carrying away the heat which is exhausted by fans

is 2 ft. 10 in. wide. Mounted on one side of the furnace is a small vertical steam engine which drives the hearth by a pinion and rack on the bottom of the hearth, with the necessary speed reduction through gears to provide the slow speed required. Parts to be heat treated make one circuit of the furnace, the hearth making one revolution in from 60 to 140 min., the speed depending upon the parts to be heat treated.

There are two of these furnaces located near the center of the heat-treating department, and they are used both for heating for quenching and for heating for drawing. One of these furnaces is now fired with producer gas. A large combustion chamber, 8 ft. in diameter, is located in the center of the furnace. Hot gases pass through ports over the top of the hearth, out through ports adjoining the outer wall, under the hearth and through a flue under the floor to a stack. The furnace blast is slightly preheated by passing through a pipe under the center of the furnace and back through a parallel pipe.

The furnace is charged through a door above the hearth on one side and the work is discharged through an adjoining door. The discharge door adjoins the quenching tanks beneath the two furnaces. There are two of these tanks, side by side, one for oil and one for water, each 12 ft. long, 4 ft. wide and 4½ ft. deep. Small parts are raked from the furnace upon a movable chute on which they slide into the quenching tank. A pneumatic hoist, mounted on an I-beam so that it can be moved from one tank to the other, is suspended over the tanks for lifting out the baskets of hardened parts. In general practice parts go from one furnace to the quenching bath, and then to the second furnace for the drawing heat. The capacity of each heat-treating furnace is about four times that of furnaces of the standard type.

For general heat-treatment work there are, in addition to the rotating furnaces, six furnaces of the company's design of the semi-muffle type with

5 x 5 ft. hearths. These are generally similar to the carbonizing furnaces except that the hearths are 30 in. above the floor level. They are placed in two rows, four on one side and two on the other facing each other. The blast for the furnaces is preheated and there are exhaust flues in the front and rear to secure a greater uniformity in temperature. Between the furnaces are two oil and water quenching tanks into which parts are carried by chutes from the furnace doors. These quenching tanks are 8 ft. long, 4 ft. wide and 4½ ft. deep. They are served by a pneumatic hoist.

The pyrometer system includes control signal lights which are flashed over the furnaces from the central station pyrometer booth. Rare metal thermocouples are used. The central station also has a Leeds & Northrup Co. recording Potensometer which records the temperature of the 16 furnaces connected to the system. The thermocouples in each furnace are checked each week against a standard thermocouple and the Potensometer. A standard time and standard temperature are specified for heating each part, controlled by the operator of the central station booth by the colored signal lights.

Gears and pinions are heated in molten lead in six pot furnaces and gears are quenched in two Gleason hardening machines, the gear being clamped in dies affixed to plungers that immerse it in an oil bath when the machine is tripped, this method of hardening being used to prevent distortion. Special equipment, designated as a quenching bench, is provided for hardening pinions. This consists of six circular receptacles about 6 in. in diameter, in which oil is kept in circulation by a small pump. In operation a spider or support in each quenching tube is raised by a lever above the oil surface, the pinions are placed on the spiders, the reverse movement of the lever lowers the spiders carrying the pinions down into the oil, automatically putting the oil into circulation. The pinions are immersed to a depth that leaves the



View in Producer House Showing the Three-Section Gas Producer. The generator appears in the background at the left and the tar extractors in the foreground at the extreme right

threaded end of the shank standing out above the oil, where it is allowed to cool slowly in the air. By this method of localized hardening the teeth of the pinions are brought to the required hardness and the shank is kept soft. Otherwise it would be necessary to anneal the shank after hardening the whole pinion. This department also includes three cyanide hardening furnaces.

The miscellaneous heating equipment includes five small furnaces of the semi-muffle type and a special rotary furnace in which the work to be hardened is placed in a hopper at one end, passes through a spiral course and drops from the bottom of the furnace to a quenching tank beneath. This furnace is used for heat treating and annealing small parts such as bushings and washers. Adjoining the heat-treating department is a tool-hardening department equipped with several Hoskins electric furnaces for the heat treatment of high-speed steel.

The oil-cooling system includes direct-connected centrifugal pumps which draw the oil from the quenching tanks and force it through a series of small brass pipes in a cooling tank through which water is kept in circulation in an opposite direction. The water from the cooler goes into the water quenching tanks and from there to a cistern, which is a source of supply for the boiler house and plant fire system. Thus the water supply is conserved. The oil-cooling system was supplied by the Schutte & Koerting Co.

The gas producer plant adjoins the forge shop and is some distance from the heat-treating department. This plant, which was supplied by the Smith Gas Engineering Co., is a three-section producer consisting of two end sections and one intermediate section with a capacity of 18,000,000 B.t.u. per hr. at rated load with an overload capacity of 20 per cent for 2 hr. The gas is guaranteed to have a heating value of 140 B.t.u. per cu. ft. when the plant is operated at the rated load with the bituminous coal used. The gas is cooled and cleaned in glass

wool tar extractors before being delivered to the distributing main. The gas is carried to the forge shop in a 24-in. spiral riveted galvanized iron pipe and a 12-in. line carries it from there to the heat-treating department. From the latter 4 and 6 in. feeders supply the furnaces at a pressure of $1\frac{1}{4}$ and $1\frac{1}{2}$ oz. per sq. in. The only change required in substituting producer gas for fuel oil in the furnaces was the enlargement of the passages from the combustion chamber to the hearth. The company is at present using producer gas in the forge shop in an experimental way, and expects eventually to substitute this for oil in the forge shop furnaces.

Census of Engineers Completed

WASHINGTON, Oct. 2.—As the result of a careful census just completed by the Bureau of Mines, 7500 mining engineers and metallurgists and 15,000 men engaged in various chemical industries have been classified for the Council of National Defense, according to the character of the work in which each one claims proficiency. The classification includes not only specialists in various branches of mining, metallurgy and chemistry, but embraces a sub-class of men who have had experience in various foreign countries. It is not the purpose of this census to enable the bureau to act as a clearing house for technical men in obtaining commercial positions, but to secure a record that will be available whenever the Council of National Defense desires to call upon these professions for assistance. "The war to-day," says Director Van H. Manning of the Bureau of Mines, "is one in which chemists and engineers play a far greater rôle than ever before. The products of the mines, furnaces, factories, and chemical plants are being so rapidly consumed that the highest possible skill is required to keep pace with the destruction everywhere apparent. In the organization of a great army, many classes of specialists are needed, and the problem is to get the best qualified men for each place."

The work of conducting this census was carried on in co-operation with the American Institute of Mining Engineers and the American Chemical Society.

Algoma Steel Co. Activities

The Algoma Steel Corporation, Sault Ste. Marie, Ont., is building another blast furnace, which, when completed, will have a capacity of 400 tons of pig iron per day. It is expected that the furnace will be completed by the first of the year. The company's work at the present time is confined purely to the turning out of 4.5 and 6-in. shells, and contracts on hand will keep the plant working to capacity for some months to come. The company recently completed its open-hearth furnace at the Soo plant, with a capacity of 75 tons per hearth, or about 200 tons per day. This makes the tenth open-hearth furnace which the company has in operation as well as the duplex furnace, which has proved most satisfactory.

The Granby Consolidated Mining & Smelting Company, with plants at Granby and Anyox, B. C., plans extensive improvements to its properties at a cost of \$1,250,000 to \$1,500,000. A new by-product coke plant will be built to supply the company's needs.

The Bramcote Foundry & Machine Co., Pottstown, Pa., will double the capacity of its plant soon. An annex has just been completed in the molding department, and excavations are now being made for a new machine shop, 48 by 120 ft.

The Norfolk Development Co., Quincy, Mass., has awarded a contract for 100 houses to be occupied by employees of the Fore River Shipbuilding Corporation.

AIRCRAFT BOARD FORMED

Given Official Standing and Important Powers by Congress

WASHINGTON, Oct. 2.—A long step forward in the development of the aircraft program of the War and Navy Departments was taken during the past week, when both houses of Congress passed and President Wilson signed the bill formally creating the Aircraft Board. Heretofore the work of the board has been done by a committee of the Council of National Defense, but in view of the serious technical problems to be considered and the responsibility resting upon the men engaged in their solution because of the colossal appropriation of \$640,000,000 for this work, it was deemed advisable to give the board a statutory standing and to render it a permanent division of the executive departments.

The new law provides that the board shall be composed of nine members and shall include a civilian chairman, the Chief Signal Officer of the Army and two other Army officers to be appointed by the Secretary of War; the Chief Constructor of the Navy and two other Naval officers to be selected by the Secretary of the Navy, and two additional civilian members. The chairman and the civilian members are to be appointed by the President and confirmed by the Senate. The civilian members are required to serve without compensation.

The board is empowered, under the direction and control of the Secretaries of War and the Navy, "to supervise and direct, in accordance with the requirements prescribed or approved by the respective departments, the purchase, production, and manufacture of aircraft engines, and all ordnance and instruments used in connection therewith, and accessories and materials therefor, including the purchase, lease, acquisition, or construction of plants for the manufacture of aircraft, engines, and accessories: Provided, That the board may make recommendations as to contracts and their distribution in connection with the foregoing, but every contract shall be made by the already constituted authorities of the respective departments." The board is also authorized to employ clerks and such technical experts and advisors as may be necessary, to fix their salaries and to rent quarters, but the total amount to be spent for these purposes shall not exceed the appropriation of \$100,000 carried by the bill. It is understood, of course, that this appropriation covers merely the administrative work of the board in Washington, the larger appropriation heretofore made being available for designing, manufacturing and testing airplanes and all their adjuncts.

The Aircraft Board has called a special two-day meeting for Thursday or Friday of this week of representatives of all interests concerned in the manufacture of aircraft to place definitely in effect a series of standards for airplane fittings which has been worked out by the Aeronautic Standards Committee of the Society of Automotive Engineers, acting in co-operation with the board. The army and navy as well as aeronautical manufacturers and engineers will be represented, and the meeting is expected to advance a common simplified practice in airplane parts and appliances and in specifications of materials in both branches of the service and throughout the country. The progress of the standardization work is expected to have a constant influence in advancing the work of producing airplanes in quantity.

Included in the list of subjects for which standards have been established by the committee and which will be finally passed upon at the coming meeting are dope and varnish, engine testing specifications, inspection methods, machine gun mounting, propeller ends, safety belts, non-ferrous alloys and steel alloys. The committee has previously determined standards for many important fittings, such as stick and wheel controls, bearings, engines, supports, magneto dimensions, screws and bolts of various types, various grades of steel, and heat treatments.

The Society of Automotive Engineers Committee

has been working in close co-operation with the International Standards Board, composed of American and Allied representatives, of which F. G. Diffin is chairman, and which is working on the problem of establishing common material specifications and fitting standards for the Allies and the United States. In most cases the International Standards Board will probably find it possible to adopt for international practice the major standards established by the Society of Automotive Engineers Committee, while the latter in turn can accept standards which the International Standards Board has already worked out. The work is thus being carefully correlated, leaving each free to turn to separate fields without duplication.

As one example of the simplification which has resulted from the work of the standards committee, there were formerly six or eight different sizes of airplane wheels manufactured in this country, each requiring a different tire and different adjustments without any compensation in efficiency. This number was first reduced to five, then to three, and now will probably be reduced to one size with a new design of rim to take two different sizes of tires, varying with the weight of the machine.

New Institute Members

The following have been elected to membership in the American Iron and Steel Institute, subject to occurrence of vacancy:

S. T. McCall, secretary-treasurer, American Manganese Steel Co., Chicago; H. H. Newson, director of purchases, Standard Parts Co., Cleveland; Robert W. Waltenbach, vice-president, McMyler-Interstate Co., Bedford, Ohio; Joseph H. Andrews, president, The Andrews Steel Co., Newport, Ky.; Paul Sturtevant, banker, director of American Rolling Mill Co., Pittsburgh; Louis J. Lind, vice-president, Witherow Steel Co., Pittsburgh; Dan J. Ryan, president and general manager, Allyne-Ryan Foundry Co., Cleveland; Michael J. Sweeney, vice-president and treasurer, Allyne-Ryan Foundry Co., Cleveland; James Harvey Williams, president, J. H. Williams & Co., Brooklyn, N. Y.; William P. Witherow, president, Witherow Steel Co., Pittsburgh; Joseph A. Krantz, secretary, Reeves Mfg. Co., Canal Dover, Ohio; John Goodin Carruthers, assistant manager of sales, Carnegie Steel Co., Cincinnati; Francis S. MacIlvaine, metallurgical engineer, Lukens Steel Co., Coatesville, Pa.; Louis Follet, president, Standard Tin Plate Co., Canonsburg, Pa.; Arthur J. Krantz, treasurer, Reeves Mfg. Co., Canal Dover, Ohio; Sterling P. Delano, sales manager, Linde Air Products Company, New York; Peter Richard Foley, general manager of sales, Eastern Steel Co., Philadelphia; Joseph Warner, president and general manager, Warner Iron Co., Nashville, Tenn.; Ernest Hallock Webb, president, The Webb Wire Works, New Brunswick, N. J.; William Dalton, general manager, Washington Steel & Ordnance Co., Washington; Henry C. Dubois, manufacturer of ferromanganese, Philadelphia; Oden H. Wharton, president, Crucible Steel Co. of America, Pittsburgh; Banks Hudson, general manager, Princess Furnace Co., Inc., Glen Wilton, Va.

The Bradford-Ackerman Corporation, Forty-second Street building, New York, announces that it has been appointed the Eastern sales office for Young Brothers Co., Detroit. The sale of Young ovens, for japanning and drying purposes, will, in the future, be handled by this Eastern office for the New England States, New York, New Jersey, Maryland, Delaware and Eastern Pennsylvania. An engineering department will likewise be available for manufacturers in the East who are interested in quick drying and baking processes, and special oven designs will be offered to meet various requirements.

The Williamsport Wire Rope Co., Williamsport, Pa., has recently completed the installation of a new wire-drawing plant, to be used exclusively for works production. The company is operating at full capacity, giving employment to more than 200 hands.

The Philadelphia office of Joseph T. Ryerson & Son has been moved from 423 Commercial Trust Building to 1103 Widener Building.

New Bill to Control Iron and Steel Prices

Revised Draft of the Pomerene Measure Made by the Federal Trade Commission Will Be Pushed for Passage

WASHINGTON, Oct. 2.—The Pomerene bill providing specific statutory authority for the President to control the prices and, if necessary, the distribution of iron and steel for the Government, the Allies and the American consuming public, was taken up for consideration in executive session by the Senate Committee on Interstate Commerce on Sept. 28, and after exhaustive discussion a decision has been reached to refer the measure to a subcommittee to redraft the bill, with a view to its early presentation to the Senate with a recommendation for its passage. The Federal Trade Commission has presented to the committee a revised draft of the Pomerene bill embodying a number of modifications intended to remove constitutional objections and to reinforce the power of the President to administer the act. This draft will form the basis of the work of the subcommittee. It is the expectation of the advocates of this legislation that the full committee will report a bill to the Senate before adjournment and that the measure will then rest on the calendar until Congress meets on Dec. 4, when there will be sufficient time to consider the bill and pass it in both houses before the arrangement concerning basic prices of iron and steel products recently promulgated by the President expires on Jan. 1 next.

Price-Fixing Does Not Dispose of Pomerene Bill

The meeting of the Senate Committee on Interstate Commerce on Sept. 28 for the consideration of the Pomerene bill was well attended and there was an exceedingly interesting discussion of the provisions of the measure and of the testimony presented to the committee by Commissioner Davies and his associates of the Federal Trade Commission at the hearing on Sept. 21. There appeared to be general unanimity as to the proposition that the President's action in fixing certain steel prices in no way relieves the necessity for the ultimate passage of a broadly grounded statute dealing with the whole subject. Members of the committee drew attention to the fact that the arrangement made between the War Industries Board and certain leading men in the steel industry will remain in force but three months, when it will be subject to revision.

Senator Pomerene declared it to be his opinion that the representatives of the steel industry, who negotiated the price schedule with the War Industries Board, could only speak for certain large interests and did not represent and cannot bind the smaller producers of the country. This point he urged with considerable emphasis, calling the committee's attention to the fact that whatever the powers of the President may be, in default of a specific law on the subject, many good lawyers are prepared to contend that manufacturers whose products are in effect commandeered at certain fixed prices under the President's proclamation will have an action against the Government if such prices represent less than cost plus reasonable profit.

Recourse of Manufacturers Against Government

This phase of the case has received considerable attention at the hands of the Federal Trade Commission and is discussed in a memorandum prepared for the Senate Committee by Arthur W. Fairchild, special attorney for the commission in the steel investigation. Mr. Fairchild says in part:

"Considerable doubt has been expressed by lawyers, particularly those who have given the matter any thought, as to the effect of the Fifth Amendment of the Constitution upon Legislation of this kind; that is, that part of the amendment which requires the payment of just compensation for private property taken for public use. The query has been made as to what will

be the result if the Government should see fit to take over the steel plants or should see fit to commandeer, by process provided in the law, viz., the creation of a buying and selling agency, all the output of a plant, buying it for the Government and reselling it again.

"Let us suppose, for instance, that under the Lever act the Government should see fit to take over the coal output of the country and distribute it by purchasing and selling agencies, which say to the owners of the mines, 'We will pay you \$2 per ton for your coal,' and the coal should be purchased at that price and resold at that price plus a margin of profit. Query: May the producer with any reason claim that this \$2 does not represent an adequate compensation in the light of the existing conditions? Can he say, 'We had a market for our coal at very much higher prices; we had a demand far exceeding the supply; we had economic conditions which would doubtless result in still higher prices, and the Government has paid us only \$2 for our coal. We are entitled to the difference.' In other words, is there a question or a possibility that the Government may be called upon, at the end of the war, to pay to the owners of the plants, or the owners of property commandeered, a much larger amount than the price which has been fixed by the Executive?"

Police Power or Appropriation?

"There are, of course, two pertinent powers of government. There is the national police power, or perhaps more properly the war power, and the power of eminent domain which permits in the one case an impairment of property and even its destruction for the common good, and the other, which permits the Government to take it for its own use upon payment of an adequate price. Police power and the power to take have been, through all the cases, very clearly differentiated. If the exercise of power is the exercise of a police power, which seems akin to the war power, it may result in great impairment of property and may result, in cases, in total destruction of property, but for that impairment or destruction the Government is not obliged to recompense. On the other hand, if the Government 'takes' property and appropriates it to its own use, then, under the Fifth Amendment, it is obliged to pay just compensation.

Possible Methods of Taking Steel

"So the question is for the Executive primarily, and for the legislative department. What steps may be taken without complicating the situation; without injecting into it further than necessary the possibility of the Government later being obliged to pay larger sums than the sums fixed for the property and plants?"

"Under this act, as I view it, there are four possible methods which may be employed: First, the price-fixing method; second, the regulation method—regulation of production, distribution and apportionment; third, the commandeering of plants upon paying a fair rental, and fourth, the purchase of the output, really a pooling of it, and the resale to the public generally.

"Briefly I may say that it has seemed to me, with such short consideration as I have been able to give it, that price fixing and regulation would not be deemed a 'taking' of property under the Fifth Amendment; that it would be, assuming the exigency, within the power of the Government to fix the price and to regulate the production and shipment and distribution and apportionment of products without taking the property in a constitutional sense.

Commandeering Means Compensation

"On the other hand, if the Government should see fit to actually commandeer the plant, or actually com-

mandeer the output, then it would seem a taking, under the Constitution, which would require just compensation. Of course, in estimating that just compensation, if the Government should see fit to adopt either of the two latter courses, there must, if the rules applicable to eminent domain should obtain, probably be taken into consideration all of the elements that enter naturally into a determination of an adequate compensation. On the one hand, there would be the present high prices, the over-demand, or demand exceeding the supply, and the possibility or probability of future enhanced prices; but, on the other hand, there should be taken into account the economic exigency, the possibility of a disruption of the industry, because of these war conditions, and the whole possible ultimate effect of these conditions upon the industry which, of course, in the end but for the Government action, might result in disaster to it.

"So I take it that if, short of confiscation, an administrative officer or designated board should fix a compensation, a court would be very loath to alter that finding, because the weight which must be given this or that element is one of fact or mixed law and fact, and the court ordinarily does not modify a finding which is based upon a disputed fact. But the question is there, nevertheless, and the executive officer or board will naturally wish to avoid it. Therefore, in preparing this bill it would seem important to have the powers, short of taking of property, very accurately defined and given.

Piecemeal Commandeering

"There is another thing that occurred to me: This bill, of course, is fashioned after the Lever act, and that act provides for the taking over of plants and businesses of coal producers. The steel industry differs, of course, radically from the coal industry, in that there are so many different products of the industry, and the industry is integrated to such an extent that it really, in certain instances, is a combination of a very large number of different industries into one. The language of the bill, as it stands, might be taken as requiring the commandeering of the whole plant and business of any given company, if any is to be commandeered. I can conceive of a case where the Government might desire to take over perhaps only a small portion of the plants or business of particularly a highly integrated company, and my suggestion would be to broaden out the power conferred by inserting in the bill, after the word 'appurtenances,' the words 'or any part,' so that the Government might take over one branch of a particular company instead of being required to take over the entire thing."

Text of the Trade Commission Bill

Mr. Fairchild's views, as outlined above, are reflected in the text of the bill submitted to the committee on behalf of the Federal Trade Commission, which, because of the attention this important matter is now commanding in the steel trade, will be examined with interest. It is as follows:

POWER TO FIX PRICES

Be it enacted, etc., That by reason of the existence of a state of war it is essential to the national security and defense for the successful prosecution of the war and for the support and maintenance of the Army and Navy to assure an adequate supply and equitable distribution at reasonable prices and to facilitate the movement of iron ore, iron, steel, and their products, and because thereof the President of the United States shall be, and he is hereby, authorized and empowered, whenever and wherever in his judgment necessary for the efficient prosecution of the war and for the purposes aforesaid, to fix the price of iron ore, iron, steel and their products wherever and whenever sold, either by producer or dealer, to establish rules for the regulation of and to regulate the production, sale, shipment, distribution, apportionment, or storage thereof among dealers and consumers, domestic or foreign. Said authority and power may be exercised by him in each case through the agency of the Federal Trade Commission during the war or for such part of said time as in his judgment may be necessary.

POWER TO TAKE PLANT

That if, in the opinion of the President, any such producer or dealer fails or neglects to conform to such prices or

regulations, or to conduct his business efficiently under the regulations and control of the President as aforesaid, or conducts it in a manner prejudicial to the public interest, then the President is hereby authorized and empowered in every such case to requisition and take over the plant, business, or property, and all appurtenances or any part thereof belonging to or operated by such producer or dealer as a going concern, and to operate and handle or cause the same to be operated and handled in such manner and through such agency as he may direct during the period of the war, or for such part of said time as in his judgment may be necessary.

That any producer or dealer whose plant, business, property, and appurtenances shall have been requisitioned or taken over by the President shall be paid a just compensation for the use thereof during the period that the same may be requisitioned or taken over as aforesaid, which compensation the President shall fix or cause to be fixed by the Federal Trade Commission.

SEVENTY-FIVE PER CENT DOWN

That if the prices so fixed, or if, in the case of the taking over or requisitioning of the plant, business, property, and the appurtenances, or any part thereof, of any such producer or dealer, the compensation therefor as determined by the provisions of this act be not satisfactory to the person or persons entitled to receive the same, such person shall be paid 75 per centum of the amount so determined, and shall be entitled to sue the United States to recover such further sum as, added to said 75 per centum, will make up such amount as will be just compensation in the manner provided by section 24, paragraph 20, and section 145 of the Judicial Code.

While operating and handling, or causing to be operated and handled, any such plants or business and appurtenances thereof, the President is authorized to prescribe such regulations as he may deem essential for the employment, control, and compensation of the employees necessary to conduct the same.

GOVERNMENT PURCHASE OF ENTIRE PRODUCT

Or if the President of the United States shall be of the opinion that he can thereby better provide for the common defense and the purposes aforesaid and whenever, in his judgment, it shall be necessary for the successful prosecution of the war, then he is hereby authorized and empowered to require any or all producers of iron ore, iron, steel and their products in any section of the United States, or in the entire United States, to sell their products or designated portions thereof only to the United States through an agency to be designated by the President, such agency to regulate the resale of or to resell such iron ore, iron, steel, and their products or designated portions thereof and to regulate and fix the prices thereof, and to establish rules for the regulation of and to regulate the production, shipment, distribution, apportionment, or storage thereof among dealers, consumers, domestic or foreign, and to make payment of the purchase price thereof to the producers thereof, or to the person or persons legally entitled to said payment.

That within fifteen days after notice from the agency so designated to any producer of iron ore, iron, steel and their products that his or its output or portions thereof is to be so purchased by the United States as hereinbefore described, such producer shall cease sales or shipments of said product upon his own account and shall transmit to such agency all orders received and unfilled or partially unfilled, showing the exact extent to which shipments have been made thereon, and thereafter all shipments shall be made only on authority of the agency designated by the President, and thereafter no such producer shall sell any of said products except to the United States through such agency, and the said agency alone is hereby authorized and empowered to purchase during the continuance of the requirement the output of such producers.

That the prices to be paid for such products so purchased shall be based upon a fair and just profit over and above the cost of production, including proper maintenance and depletion charges, the reasonableness of such profits and cost of production to be determined by the Federal Trade Commission, and if the prices fixed by the said commission of any such product purchased by the United States as hereinbefore described be unsatisfactory to the person or persons entitled to receive the same, such person or persons shall be paid 75 per centum of the amount so determined and shall be entitled to sue the United States to recover such further sum as added to said 75 per centum will make up such amount as will be just compensation in the manner provided by section 24, paragraph 20, and section 145 of the Judicial Code. All such products so sold to the United States shall be sold by the United States at such uniform prices, quality considered, as may be practicable and as may be determined by said agency to be just and fair.

Any moneys received by the United States for the sale of any such iron ore, iron, steel, and their products may, in the

discretion of the President, be used as a revolving fund for further carrying out the purposes of this section. Any moneys not so used shall be paid into the treasury as miscellaneous receipts.

TRADE COMMISSION COST INQUIRY

That when directed by the President, the Federal Trade Commission is hereby required to proceed to make full inquiry, giving such notice as it may deem practicable, into the cost of producing under reasonably efficient management at the various places of production the following commodities, to wit: Iron ore, iron, steel, and their products.

The books, correspondence, records and papers in any way referring to transactions of any kind relating to the mining, production, sale, shipment or distribution of all producers or other persons whose iron ore, iron, steel, or their products have or may become subject to this act, and the books, correspondence, records and papers of any person applying for the purchase of iron ore, iron, steel, or their products from the United States shall at all times be subject to investigation by the said agency, and such person or persons shall promptly furnish said agency any data relating to the business of such person or persons which said agency may call for, and said agency is hereby authorized to procure information with reference to the business of such producers and the customers therefor in the manner provided for in sections 6 and 9 of the act of Congress approved Sept. 26, 1914, entitled "An act to create a Federal Trade Commission, to define its powers and duties, and for other purposes," and said agency is hereby authorized and empowered to exercise all the powers granted to the Federal Trade Commission by said act for the carrying out of the purposes of this act.

Having completed its inquiry respecting any commodity in any locality it shall, if the President has decided to fix the prices at which any such commodity shall be sold by producers and dealers generally, fix and publish maximum prices for both producers and of dealers in any such commodity, which maximum prices shall be observed by all producers and dealers until further action thereon is taken by the commission.

In fixing maximum prices for producers the commission shall allow the cost of production, including the expense of operation, maintenance, depreciation, and depletion, and shall add thereto a just and reasonable profit.

In fixing such prices for dealers the commission shall allow the cost to the dealer and shall add thereto a just and reasonable sum for his profit in the transaction.

PENALTY FOR HIGHER PRICES

Whoever shall, with knowledge that the prices of any such commodity have been fixed as herein provided, ask, demand, or receive a higher price, or whoever shall, with knowledge that the regulations have been prescribed as herein provided, violate, or refuse to conform to any of the same, shall, upon conviction, be punished by a fine of not more than \$5,000 or by imprisonment for not more than two years, or both. Each independent transaction shall constitute a separate offense.

Nothing in this section shall be construed as restricting or modifying in any manner the right the Government of the United States may have in its own behalf or in behalf of any other Government at war with Germany to purchase, requisition, or take over any such commodities for the equipment, maintenance, or support of armed forces at any price or upon any terms that may be agreed upon or otherwise lawfully determined.

Existing Contracts an Obstacle

The question uppermost in the minds of those who are studying this problem with a view to adjusting it through legislation is the disposition of existing contracts, which, according to the investigation made by the Federal Trade Commission, cover a very large amount of the current production and run from six months to a year into the future. Commissioner Davies, in his statement before the Senate Committee published in *THE IRON AGE* last week, emphasized this feature, and Dr. Walker, the chief economist of the commission, who for the past two years has made a special study of the steel industry, has dwelt upon it in a statement supplementing Commissioner Davies.

"Assuming the Government would fix the price of pig iron at \$25," says Dr. Walker, "there would be a great difference in the cost of production of those who bought at the Government price and those who bought on the existing bona fide contracts, which would, in my judgment, upset any reasonable price-fixing scheme that the Government might decide on for future steel production; hence, it would appear that these bona fide contracts, if allowed to continue, would completely upset

a successful scheme of price regulation at any reasonable figure. No man could compete with a difference of \$10 per ton in the cost of pig iron against him, let alone a difference of \$25 which would occur in some instances."

Proposed Cancellation of Contracts

Chairman Newlands, who has constantly had in mind the idea that the consumption of iron is so universal that Congress possesses the constitutional power to decree it to be a public use, has frankly suggested the cancellation of all outstanding contracts. "If the Government," he said, "has the power to decree this to be a public use and the courts should sustain the exercise of that power, all contracts would be abrogated. I assume that a water company is a purely private organization, supplying its customers with water, if it has not as yet been decreed to be a public use and subject to public regulation; but just as soon as that declaration is made, at that moment all contracts and all persons have a right to resort to the public utility for the commodity upon equal terms. Therefore, my mind is directed to this as the possible solution of the whole question, whether we could not simplify it by confining the regulation purely to iron ore, pig iron and steel billets or steel plates, upon the assumption that the basic price of these things being fixed and being reasonably fixed, all the products in which they enter will be sold at a reasonable price."

To this suggestion Dr. Walker takes exception. "In the present state of the steel market," he said, "as a matter of practical study, I should not anticipate that that would be the consequence. We find it illustrated in the steel market at the present time. The prices of ore are comparatively high—higher than ever before. The prices of coke are very high—unheard-of prices. They have produced a high cost of pig iron; but, even taking those prices of ore and coke, translating them into the cost of pig iron, as it is done for those who have to purchase it, and getting a very high pig-iron cost on that account, we do not find the price of pig iron corresponds even to that high cost, but is away above this high cost of pig iron."

Prices Out of All Relation to Cost

"In other words, the same factor that has made the coke price out of all proportion to the cost of coke makes the pig-iron price high out of all proportion to the cost of pig iron, made even by the people who are paying the highest prices for raw material. And so in successive stages we find with certain costs of steel that the price of shapes is one thing and the price of plates very different, although normally the cost of shapes and plates is approximately the same, and normally their prices have been about the same; in fact, one familiar with the past prices of the articles knows that ordinarily they were quoted at the same level, especially if there was any general agreement about what the prices ought to be among the producers."

"Now, take the price of shapes to-day. I do not remember the exact figures, but it is about one-half the price of plates. Why? Not on account of different conditions in cost of crude steel, but on account of different demand conditions for these different articles. The same thing that has put the price of pig iron away above the cost of even high-cost pig iron has put the price of plates away above even the high cost of plates and much higher than the price of shapes, which normally, and even under present conditions, has for the same mill the same cost approximately as plates. So you can not rely on fixing a basic price to get an even proportionally reasonable price of successive products, and the illustration of plates and shapes is one of the very best illustrations you could pick out. And taking them as typical is a mistake; plate prices are away out of proportion to any products of a similar degree of manufacture."

Extent of Steel Price Fixing

Another exceedingly interesting phase of this subject to which members of the Senate committee are giving attention is the question as to how far Government price-fixing should go in the listing of steel com-

modities. In reply to a question as to "how far it would be necessary to go in fixing the prices of the various successive products in order to insure justice both to the Government and to the public," Dr. Walker gave it as his opinion that the category should include "all semi-finished steel, including blooms, slabs and billets, sheet bars, plates, rails and shapes, merchant bar and skelp for rolling tubes, rolled and drawn tubes, galvanized sheets, tin-plate and numerous additional items."

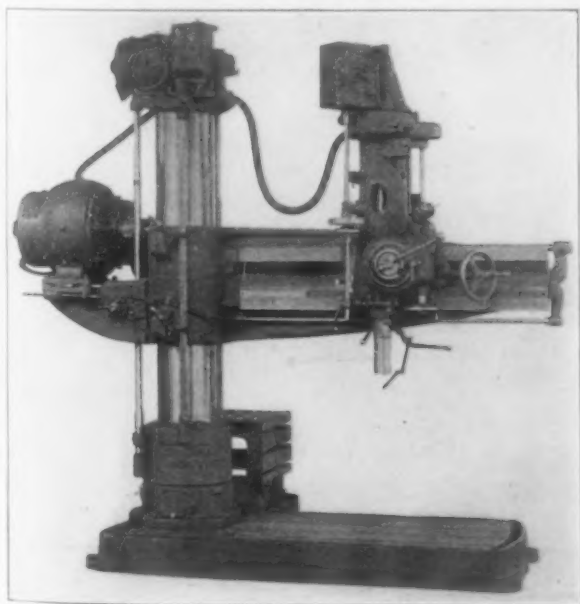
The committee's attention has also been called to the fact that in England the Government has established the prices of more than a hundred items, including the typical products of nearly every important plant. The Trade Commission has investigated the practical operation of the British law and finds it to have been successful, but to require a very large administrative force, chiefly because of the minute detail into which the control has been ramified and which extends to builders' hardware and a considerable variety of small completely finished articles.

For the convenience of its members the Senate Committee has reproduced the tables and chart showing iron and steel prices for the nineteen-year period, 1898-1916, which appeared in the Jan. 4 issue of THE IRON AGE. The printed report of the recent hearings will also contain the controlled prices for iron and steel products fixed by the British Government. W. L. C.

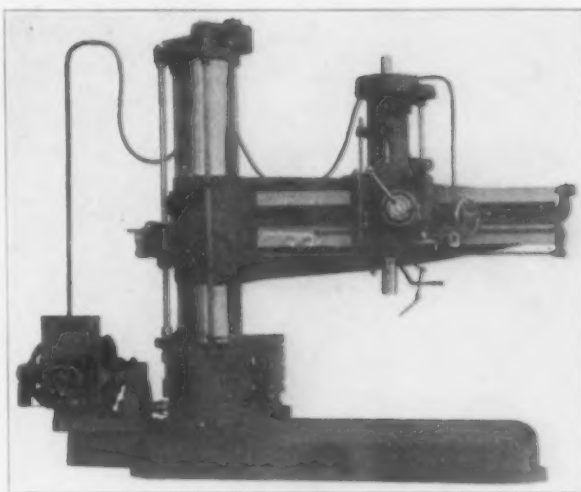
Motor-Driven Radial Drilling Machines

Some interesting arrangements of adjustable-speed motor drive for radial drilling machines have been developed by the Cincinnati Bickford Tool Co., Oakley, Cincinnati, Ohio. This type of drive can be applied to practically all of the machines built by this company, the two illustrated being perhaps as good examples as any of the extent to which this form of drive has been developed. Both machines are of the plain type and the equipment includes a plain table, an arrangement for supplying cutting lubricant to the drill point, and an air-operated device for clamping the arm in place on the column.

One of the machines, which is built with 4, 5 and 6 ft. arms, is driven by an adjustable-speed motor mounted on the arm and geared directly to the arm shaft. This motor has a speed range of 3 to 1 and the controller for it is mounted on the drilling head on the arm. A constant-speed reversing compound wound motor mounted on the top of the column provides for the raising and lowering of the arm. The operation of this motor is controlled by a reversing switch actuated by a square shaft equipped with the builder's patented interlocking device and a dynamic brake resistance. The



Motors Mounted on the Arm and Column Drive the Drill and Raise or Lower the Arm



An Adjustable Speed Motor with a Smaller One for Speed Regulation Attached to It Is Provided for a Line of Plain Radial Drilling Machines with 4, 5 and 6 Ft. Arms

wiring for this motor is led in through a revolving connection in the base of the column and runs up through the center to the top.

The other machine, which is also built with 4, 5 and 6 ft. arms, has an adjustable-speed motor with a starter and a smaller one for speed adjustment attached to the larger motor. The speed control is of the Reliance remote push-button type, the starting and stopping buttons being mounted on the head of the machine.

In addition to the motor-drive arrangements illustrated, three other types of drive can be supplied. These are a belt and cone pulley and through a gear box, either with or without an electric motor.

New Steel Foundry at Massillon

The Massillon Steel Casting Co., Massillon, Ohio, recently organized with a capital stock of \$250,000, has commenced the erection of its new steel foundry which it expects to have in operation about Dec. 1. One unit, 100 x 100 ft., will be built at present and arranged with a view of adding additional units later. In addition, two other buildings will be built, one for cleaning and annealing and the other for pattern storage. The foundry will be equipped with a two-ton converter and a Whiting cupola. A Chicago Pneumatic Tool Co. two stage air compressor, with a capacity of 750 cu. ft. of free air per minute, will be installed to furnish blast for the sand blast machine, a General Electric centrifugal compressor for the cupola and a No. 5 Root positive pressure blower for the converter. The plant will be served by a five-ton Bedford Foundry & Machine Co. crane. Complete molding machine equipment will be installed, this including seven Osborn, Tabor and Herman machines. The product of the plant will include steel castings of 200 lb. in size and under. E. H. Birney is president, Fred H. Snyder, vice-president, I. M. Taggart, treasurer, and A. H. Anthony, general manager.

The Northern Iron Co., Plattsburgh, N. Y., recently suffered a \$50,000 loss by fire at its Standish, N. Y., blast furnace. The machine shop, carpenter shop and some of the trestles and storage bins were destroyed. Temporary repairs were made, so that the blast furnace operations were resumed one week from the day of the fire. It will require about six weeks to replace the destroyed buildings, and meanwhile the company will operate its furnace at a somewhat reduced capacity.

The Union Iron Works, Erie, manufacturers of steel boilers, has let a general contract for a new boiler and power house. The concern states the only equipment it needs for the new plant is a small coal-handling proposition, as there will be no new equipment put in the plant, this being merely a removal to a new site of the old equipment. The building will be one story high, 58 x 89 ft. in size and will cost about \$15,000.

VERTICAL STEEL STORAGE

Racks in New Detroit Warehouse of Union Drawn Steel Co.

A STEEL storage warehouse designed for conservation of space and convenience and economy in handling cold drawn steel was built recently in Detroit, Mich., by the Union Drawn Steel Co., Beaver Falls, Pa. The greater part of the stock is stored in upright racks, which are of a special design, rigidly built to withstand heavy loads. The racks were adopted in preference to flat storage racks for the reason that much larger tonnages can be kept and handled in a given space. The warehouse has a capacity of 10,000 tons of steel, and it is said to be the largest warehouse in the country carrying cold drawn steel exclusively.

The warehouse is located at Joseph Campau and Guoin streets, and occupies a reinforced concrete, brick and steel building, 131 x 138 ft. in size and providing 17,600 sq. ft. of storage space. The front is two stories in height, providing an office room on the second floor, 60 x 40 ft., in addition to a smaller warehouse office on the first floor. Sufficient window space is provided to assure light in all parts of the warehouse. The windows are factory ribbed glass in steel sash. The roof is of concrete, and the floors are of 7-in. concrete reinforced on 3-in. centers, and above the concrete master builders' cement is laid. Under all racks there are solid trench walls extending 3 ft. into the ground and heavily reinforced. These walls are separate from the floor itself, so that should the weight cause the racks and their foundations to settle the surrounding floor would not be affected.

The building is divided crossways into three bays. The center bay has a steel truss roof and is used for handling material and loading. The two side bays are for storage. An electric traveling crane with a 50-ft. span is to be provided in the center bay. The ceilings of the side bays are 18 ft. in height. Railroad sidings extend on both sides of the warehouse and material is brought in on one side and loaded out on the opposite side. Two Packard trucks, each of 2 tons capacity, are provided for city deliveries.

Vertical racks are provided in the two side bays for

the storage of all material up to 1½ in. in diameter. Larger sizes and short sections are stored in flat racks. The upright racks are built back to back at a slight pitch, the main members meeting at the top where they are securely bound together. There is a 4-ft. 1-in aisle between each pair of racks. The racks are 26 in. deep and are divided into sections 42 in. wide, each section having a capacity for storing 10 tons of steel in lengths up to 16 ft. Each rack section may be subdivided into smaller sections by means of pins placed in holes provided in supporting angles at the back of the racks.

The racks are built of 7-in. channels at the back and 2 x 2 x 3/16-in. angles at the front, the angles being bolted to the channels with bolts in 1-in. pipe as spreaders. The upright angles and bolts provide the partitions between the rack sections. The horizontal cross members at the back of the racks consist of 6-in. channels at the base and five 3½ x 3½ x ¼-in. angles between the base and the top. These are bolted to the channels by the long bolts that extend through to the front of the racks. The racks are supported at the bottom by 18-in. U-bolts sunk into the concrete and at the top they are built into the side wall at one end to eliminate possible swaying. To add to the strength, braces are provided between the vertical members near the base. This construction furnishes a space 40 in. wide for the flat storage of steel between each two racks. An angle is placed across the front of the base to prevent stock from slipping out. The racks are sufficiently strong to permit the loading to capacity on one side and leaving the racks on the opposite side empty.

An unusual feature in the warehouse is the providing of steam pipes under the racks beneath the cross braces and also beneath the flat racks. These are connected from overhead lines with the warehouse heating system, and keep the temperature at about 65 deg. in the coldest weather so that condensation of moisture on the stock that would otherwise cause rust is prevented. The racks were fabricated and erected by the American Bridge Co.

The warehouse equipment includes a portable shop crane of 2 tons' capacity, two Cochrane & Bly motor-driven circular saws with a capacity for cutting up to 6 in. in diameter and 5-ton Fairbanks portable scales of the rolling mill type.

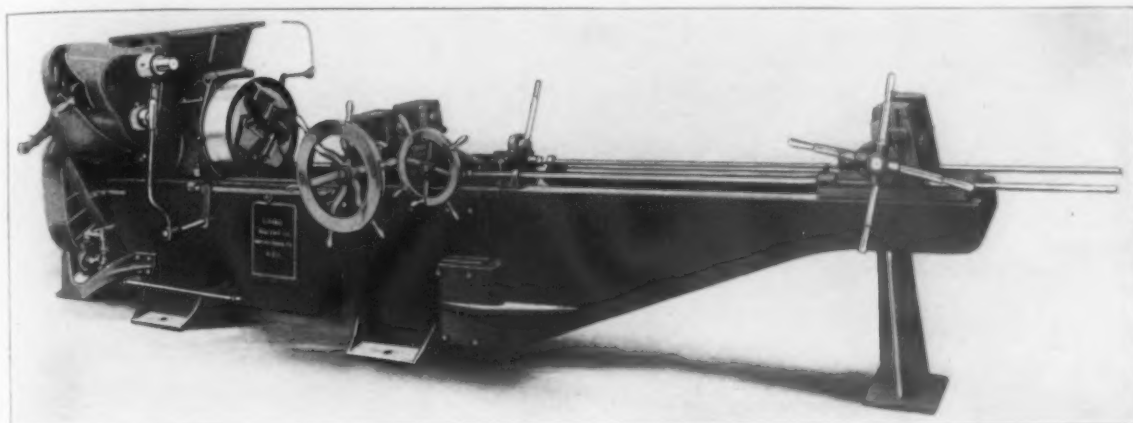


Space is conserved in the new cold drawn steel warehouse of the Union Drawn Steel Co. by storing stock up to 1½ in. in diameter in vertical racks which are heated beneath to prevent the stock from rusting

The stock carried includes 0.40 to 0.50 per cent carbon axle steel, 0.15 to 0.25 carbon open-hearth case hardening steel, $3\frac{1}{2}$ per cent nickel and $1\frac{1}{2}$ per cent chrome nickel steel; 0.15 to 0.25 carbon open hearth steel in all sizes and shapes, Bessemer steel for screw

Threading Machine for Staybolt Tubes

A recent addition to the extensive line of machinery which has been developed for use in shipbuilding plants is a machine for threading hollow staybolt tubes that



Hollow Staybolt Tubes Ranging from 6 to 8 Ft. in Length and from $2\frac{3}{4}$ to $3\frac{1}{2}$ In. in Diameter Are Threaded by a Recently Developed Machine

stock, and shafting and flats in both Bessemer and open hearth steel.

Reorganizes Sale Department

The Cleveland Brass & Copper Mills, Inc., which placed its plant at Euclid, Ohio, in operation a few days ago, has organized its sale department under the management of B. M. Gardner, secretary and sales-manager, and in addition to its main office in Cleveland will maintain a branch office in the Dime Bank Building, Detroit, Ellicott Square Building, Buffalo, Railway Exchange Building, Chicago, and Reibold Building, Dayton, Ohio. The plant will produce sheets and rods in brass, copper and bronze. The company is financed largely by Cleveland capital, and at its head is H. C. Osborn, who is also president of the American Multi-graph Co. Some of the other directors are actively connected with large industrial enterprises in Cleveland. B. F. Brusstar is in charge of production, having resigned his position as general manager of the Detroit Copper & Brass Co. to become connected with the Cleveland mill. In addition to six years spent at the Detroit plant, he was in charge of the brass mill department of the Winchester Repeating Arms Co. for 14 years, after an earlier training with Randolph, Clowes & Co. and other New England mills. The plant, which is modernly equipped, was designed and erected under the supervision of Westinghouse, Church, Kerr & Co.

Canadian Iron and Steel Production

TORONTO, ONT., Oct. 1.—The total production of steel ingots and direct castings in Canada in the first six months of the current year amounted to 836,149 short tons, an increase of 246,596 tons, or 42 per cent over the corresponding period of 1916. The average monthly production was 139,858, as against 98,259 in the first half of 1916. A new high record in output was reached during May of 155,346 tons, but the June figures show a falling off of about 18,000 tons. Pig iron output from returns covering all producers was 586,998 short tons, as against 562,097 for the corresponding six months of last year. Imports from the United States have been on a considerably larger scale. The imports of steel ingots and direct castings for the first six months of this year amounted to 139,640 short tons, against 47,493 for the same period of 1916. In pig iron the increase was from 29,801 tons last year to 38,858 tons for the present year.

The Lenni Steel Co., Philadelphia, has opened an office at 130 South Fifteenth Street, and plans for a new plant will soon be announced.

was designed and built by the Landis Machine Co., Waynesboro, Pa. Tubes ranging from $2\frac{3}{4}$ to $3\frac{1}{2}$ in. in diameter and from 6 to 8 ft. in length are handled by the machine. An auxiliary bed and carriage are provided to enable both ends of the tubes to be threaded as well as serving as a support for the tubes during the operation.

The main bed of the machine has an extension one fitted into it which in turn supports an auxiliary carriage. Threaded grips which are used in timing the threads on the ends of the tubes, as well as supporting them, are fitted to the carriage. A lead screw attachment, which is relied upon to insure accurate work and the perfect starting of the thread, is provided, together with a pitch indicator to show the correct position for engaging the lead screw nut. The builder's all steel rotary die head is used in the machine, which was designed and built for a large shipbuilding plant. A constant-speed, alternating-current motor drives the machine through an arrangement of chain and sprockets in connection with a mechanical speed change box.

In operation the tube which is to be threaded is gripped in the vise of the regular carriage and the thread cut in the customary way. After all of the tubes have been threaded on one end, a master tube threaded on both ends with a continuous thread is placed in the machine. The grooves or serrated surfaces of the chasers are made to fit the thread already cut on one end of the master tube and the other end is gripped with the threaded grip in the auxiliary carriage, care being taken to have the grips loose enough to adjust themselves longitudinally to mesh with the thread on the master tube. After the master tube is gripped in the extension carriage, the threaded grips are securely clamped in the auxiliary carriage vise jaws. The lead screw nut on the main carriage is then thrown in and the tubes to be threaded are gripped in the regular vise of the main carriage. In this way, the chasers, the lead screw and the threads on the staybolt tubes will all be timed. The master stay tube is now removed and replaced by the tubes that have been threaded on one end, the thread which has already been cut being placed in the threaded grip on the auxiliary carriage. The lead screw nut is engaged when the pitch indicator on the main carriage shows the correct position for the engagement of this nut. The second end of the tube is threaded in the regular way, thus giving a continuous thread on both ends of the tube.

On Friday, Sept. 28, the first billets were rolled in the new electric steel plant of the United States Electric Steel Co., at Connellsville, Pa. When running full, this plant is expected to turn out about 75 tons of electric steel per day in the form of billets, which will be sold in the open market.

How Malleable Iron Has Improved*

Demonstrated by Series of Tests
Covering 17 Months from Many
Makers—Marked Gain in Uniformity

—BY ENRIQUE TOUCEDA

DATA indicating the progress that has been made in the past few years in the improvement of malleable iron can best be obtained by tabulating the results of many hundreds of tests, starting from the time they began to be systematically conducted, presenting the averages in suitable form.

While prior to November, 1915, tensile test bars were sent to me by the various companies for whom I am consulting engineer, with frequency, but at odd intervals, it was not until the date referred to that it was decided to send on test bars daily which would fairly represent the product of each day's run.

Condensed Test Data

The record first presented consists of the average ultimate strength and elongation of all bars received during the last two months of 1915; of all bars received during the whole of 1916, and of all bars received during the first five months of 1917.

To the end that you may obtain a clearer idea of what these tests indicate than if you were furnished simply with the average ultimate strength and elongation of the total number of bars received during these various periods, the results have been classified for your convenience into various grades, as shown in Table 1. About 18 separate companies furnished these bars. Therefore, this data is not derived from tests of bars sent by one or two companies, but by a very significant number.

and in 1917 to 1.68 per cent. Only 2.40 per cent of the bars exceeded 52,000 lb. per sq. in. ultimate in 1914, as against 16.76 in 1916, and 18.49 per cent in 1917. In 1914, 72.35 per cent of the bars exceeded 44,000 lb. per sq. in., while in 1915, 86.42 per cent, and in 1917, 88.85 per cent exceeded that figure.

When the great difficulty that has been encountered by the manufacturer within the past six months in securing suitable coal and iron for his purpose is considered, the continued improvement in 1917 is certainly remarkable, as the handicap has been large.

Relation of Elongation to Strength

Another important fact that can be gathered from the data in Table 1 is one to which I called attention for the first time in my paper read at the Cleveland meeting last year—that malleable iron of good quality is very different from other ferrous products in one particular, in that its elongation increases with its ultimate strength. Prior to the discovery of this fact it had invariably been assumed by all writers on this subject that the reverse was true.

One of the most serious shortcomings in malleable iron in the past has been its lack of uniformity. I consider the improvement that has been accomplished in this direction within the past few years to have much more far-reaching effect on the user of this metal, and to be of greater importance to him than the ability of the founder to obtain high strength and ductility. A

Table 1.—Summary of Tests of Malleable Iron Made in 1915, 1916 and 1917

	Per Cent of Bars Under 40,000 Lb. T. S.	Per Cent of Bars Between 40,000 and 42,000 Lb. T. S.	Per Cent of Bars Between 42,000 and 44,000 Lb. T. S.	Per Cent of Bars Between 44,000 and 46,000 Lb. T. S.	Per Cent of Bars Between 46,000 and 48,000 Lb. T. S.	Per Cent of Bars Between 48,000 and 50,000 Lb. T. S.	Per Cent of Bars Between 50,000 and 52,000 Lb. T. S.	Per Cent of Bars Over 52,000 Lb. T. S.
Nov., Dec., 1915:								
Av. ult. lb. per sq. in.	5.80	9.47	12.38	21.44	21.15	16.22	11.05	2.49
Av. elongation per cent in 2 in.	4.91	6.55	7.38	8.87	9.47	10.17	11.27	13.38
Year 1916:								
Av. ult. lb. per sq. in.	2.57	3.65	7.36	13.64	18.26	21.57	16.61	16.76
Av. elongation per cent in 2 in.	5.78	6.88	7.48	8.33	9.14	10.28	11.61	12.72
First 5 months 1917:								
Av. ult. lb. per sq. in.	1.68	2.75	6.72	12.83	20.53	20.22	16.78	18.49
Av. elongation per cent in 2 in.	5.78	7.37	8.20	8.72	10.11	11.51	12.97	14.94

All bars $\frac{5}{8}$ -in. diameter, and similar in all particulars to the tensile test bar recommended by the A. S. T. M. in its specifications for malleable iron.

Looking over my records prior to the year 1914, in which there is abundant data, it was found that the average ultimate strength and elongation would approximate about 38,000 lb. and 3.50 per cent elongation, respectively, though there are occasional instances of a 46,000 and 48,000 lb. ultimate with a 6 or 7 per cent elongation. On looking over these old records it is found that the test bars then submitted were of many different dimensions varying anywhere from $\frac{1}{2}$ to 1 in. in diameter, while some were square and others rectangular in section. For this reason it is hardly possible to gather from this data any conclusions which can be compared accurately with the material that has passed through my hands since the beginning of 1914.

It will be noted in Table 1 that the proportion of the 1915 bars that failed to test up to 40,000 lb. was 5.80 per cent. In 1916 this ratio dropped to 2.57 per cent,

high ultimate strength is not always specified owing to the belief on the part of some that when the ultimate strength is in the neighborhood of 42,000 lb. per sq. in. the machine tools can be speeded up to a considerably higher rate than is possible when working with metal having ultimate strengths around 48,000 to 50,000 lb. This is a matter we will not discuss at the present time. If the individual record of many of the manufacturers, the results of whose physical tests are included in the data in Table 1, were examined, it would be found that they have made a practically uniform iron day in and day out for a period covering many months. Those whose showing is more erratic are improving.

The figures in the following tables, with one exception, were taken from the records of different companies covering iron made by them in June, this year. These data demonstrate the uniformity in the quality of the material from many consecutive heats, illustrating the fact that the manufacturer of malleable iron who is well posted in malleable practice has full control of his product. The day of "hit or miss" has passed.

*From a paper presented at the annual meeting of the American Foundrymen's Association at Boston, Sept. 26, 1917. The author is a consulting metallurgist, Albany, N. Y.

A Record Test for Elongation

The exception referred to is Table 5, in which is recorded a run of 17 consecutive heats made in February, this year. The average ultimate strength of the 17 bars is 52,784 lb. and the average elongation is 17.88 per cent, in spite of the fact that two of the bars contained a slight shrink which made them fail prematurely. In this set there are four bars with over 21 per cent elongation; one with 24.22 per cent, and one with 27.34 per cent. We have tested many bars within the past two years having an elongation as high as 24 per cent, but it is believed that 27.34 per cent is the record elongation of any malleable iron test bar $\frac{1}{2}$ -in. diameter yet produced. I might add that the reduction of area of this bar was 22.71 per cent. The data in this table are furnished you because they clearly demonstrate what is possible to achieve along the line of quality and uniformity, the goal toward which we are aiming.

Table 2.—Malleable Tests for One Foundry in June

Bar	Ultimate Strength, Lb. Per Sq. In.	Elongation, Per Cent	Bar	Ultimate Strength, Lb. Per Sq. In.	Elongation, Per Cent
1.....	46,032	8.59	9.....	46,540	8.59
2.....	50,631	8.59	10.....	48,761	7.03
3.....	46,700	8.59	11.....	51,012	9.38
4.....	50,213	8.59	12.....	49,255	7.81
5.....	46,917	7.03	13.....	47,706	7.81
6.....	48,344	7.03	14.....	52,422	7.81
7.....	47,324	6.25	15.....	50,733	9.38
8.....	54,023	9.38	16.....	47,444	9.38

Table 3.—Malleable Tests for Another Foundry in June

Bar	Ultimate Strength, Lb. Per Sq. In.	Elongation, Per Cent	Bar	Ultimate Strength, Lb. Per Sq. In.	Elongation, Per Cent
1.....	50,338	12.50	7.....	51,938	14.84
2.....	51,784	16.41	8.....	49,899	14.84
3.....	52,343	18.75	9.....	51,476	14.84
4.....	52,011	15.63	10.....	52,780	11.72
5.....	50,937	13.28	11.....	50,400	9.38
6.....	50,700	10.94			

Table 4.—Malleable Tests for a Third Foundry in June

Bar	Ultimate Strength, Lb. Per Sq. In.	Elongation, Per Cent	Bar	Ultimate Strength, Lb. Per Sq. In.	Elongation, Per Cent
1.....	51,179	10.94	13.....	47,125	9.38
2.....	48,150	8.59	14.....	47,125	7.81
3.....	50,365	11.72	15.....	46,755	10.94
4.....	47,385	10.16	16.....	49,242	10.94
5.....	49,640	10.94	17.....	49,480	10.94
6.....	47,455	9.38	18.....	49,650	12.50
7.....	50,550	14.84	19.....	49,410	9.38
8.....	48,310	13.28	20.....	49,305	10.16
9.....	48,935	18.75	21.....	49,870	10.94
10.....	51,303	11.72	22.....	48,845	12.50
11.....	48,420	11.72	23.....	49,470	11.72
12.....	49,080	12.50	24.....	48,765	15.63

Table 5.—Malleable Tests for One Foundry in February

Bar	Ultimate Strength, Lb. Per Sq. In.	Elongation, Per Cent	Bar	Ultimate Strength, Lb. Per Sq. In.	Elongation, Per Cent
1.....	55,032	21.09	10.....	51,380	11.72
2.....	53,908	21.09	11.....	51,978	24.22
3.....	54,706	21.09	12.....	52,506	17.97
4.....	52,010	17.19	13.....	52,477	17.19
5.....	50,321	10.94*	14.....	50,097	14.06
6.....	54,867	17.19	15.....	49,910	12.50*
7.....	54,283	13.28	16.....	52,204	17.97
8.....	53,537	21.09	17.....	52,311	17.97
9.....	55,804	27.34			

*Test bar broke in fillet.

As I have made mention of no tensile tests aside from those made on the standard tensile test bar recommended by the A. S. T. M., it may be of interest to record the results of tests on bars with different-cast sections. Some four months ago six sets of bars cast from the same heat and of the following sizes were sent me:

- Set No. 1, 12 bars, $\frac{1}{2}$ -in. diameter.
- Set No. 2, 6 bars, $\frac{3}{4}$ -in. diameter.
- Set No. 3, 6 bars, $\frac{1}{2}$ -in. diameter.
- Set No. 4, 6 bars, 1 -in. diameter.
- Set No. 5, 6 bars, $1\frac{1}{4}$ -in. diameter.
- Set No. 6, 6 bars, $1\frac{1}{2}$ -in. diameter.

The average results are as follows:

Set Marked	Ultimate Strength, Lb. Per Sq. In.	Elongation, Per Cent
No. 1— $\frac{1}{2}$ -in.....	52,141	15.62
No. 2— $\frac{3}{4}$ -in.....	48,062	10.54
No. 3— $\frac{1}{2}$ -in.....	47,107	9.37
No. 4—1 -in.....	47,317	11.56
No. 5— $1\frac{1}{4}$ -in.....	47,148	9.69
No. 6— $1\frac{1}{2}$ -in.....	46,592	9.69

This table should serve as a complete answer to those who maintain that, when malleable iron exceeds $\frac{1}{2}$ -in., it cannot be made strong or ductile. Our experience indicates that provided a casting is sound, high quality malleable iron can be produced to-day just as easily in sections around $1\frac{1}{4}$ in. thick as in the case of $\frac{1}{2}$ -in. sections. With increased thickness there naturally comes increased difficulty in removing all the shrinks, but we have within the past few years made great strides in the direction of securing perfect soundness in thick and intricately designed castings.

Great progress has been made in improving the physical properties of malleable iron solely and only because of a determination on the part of the manufacturers to systematically improve each step in the process.

The World's Platinum Supply

In 1916 the crude platinum mined in Colombia, estimated at 25,000 oz., was refined in the United States, and reports received from domestic refiners show that 28,088 oz. of metals of the platinum group was recovered by them from all sources, foreign and domestic, of which the bulk, 24,518 oz., was platinum. The following table shows the estimated output of crude platinum of the world during the last three years, in troy ounces. Borneo and Sumatra produced 200 oz. in 1913, but no figures are available since that date.

	1914	1915	1916
Canada	30	100	60
Colombia	17,500	18,000	25,000
New South Wales and Tasmania.....	1,248	303	222
Russia	241,200	124,000	63,900
United States	570	742	750
Total	260,548	143,145	89,932

Cement for Firebricks

A firebrick cement for which saving in time of laying the bricks and long life of the joints are claimed has been placed on the market by the Wilbride Co., Norwood, Pa., under the trade name of Amalgam. The bricks are merely dipped in the cement. This does away with the usual buttering or covering of the bricks before they are laid. When used as a lining it is claimed that the covering of the lining bricks with the cement results in an increased life of the brick.

In view of the demand for castings made under laboratory control and the consequent enlargement of the bronze department of the Titanium Alloy Mfg. Co., Niagara Falls, N. Y., this department has now been organized as a separate unit known as the Titanium Bronze Co., Inc. The company makes a specialty of worm gear blank castings for worm-driven trucks and has developed titanium-aluminum bronze for service in which heretofore English gear bronze or some similar grade of phosphor bronze has been used. The company is also die casting aluminum bronze for small motor truck and passenger car parts such as latches, cams, windshield parts and small gears.

The property of the United States Molybdenum Co. Cooper, Me., has been sold to H. S. Predmore and A. S. Gunn, New York, who are reported to represent large interests. The property is to be developed on an extensive scale and a 500-ton mill is projected to replace the 20-ton mill now operated. There is a large deposit of ore, it is said, but the mining and smelting operations have never been financially successful.

Negotiations have been instituted by the German War Office for greater co-operation among the small steel and iron rolling mills for the duration of the war. It is proposed to amalgamate several mills in the hope of increasing capacity and reducing the number of employees. Similar suggestions with regard to copper were made some time ago.

The Stanley Works, New Britain, Conn., will buy and outfit an ambulance for use with the American Expeditionary Forces. Employees in the main plant and the branches in Chicago, New York, Bridgewater, Mass., and Niles, Ohio, will be invited to subscribe.

Rushing the Construction of Ship Yards

Busy Scenes on the Delaware River—American International Corporation Asks for 25,000 Men—Other Companies Have Extensive Building Programs

SCENES at Hog Island, on the Delaware River, just outside of Philadelphia, are the busiest that can be imagined. Thousands of men are at work leveling ground, laying out new roads and tracks, erecting temporary wooden buildings and doing a vast number of other necessary things to prepare for a shipbuilding plant, which is destined to break world records in the rapid construction of steel ships. The American International Corporation, which is erecting this plant for the Emergency Fleet Corporation, has asked the Federal Employment Bureau in Philadelphia to obtain 25,000 men as quickly as possible. In view of the shortage of labor, it may be difficult to find this number of workmen, but the American International Corporation will employ all the men it can get in order to lay the keels of its first ships within four months from the date of the signing of the contract.

Temporary offices have been opened in the Bellevue-Stratford Hotel, Philadelphia, occupying the entire seventh floor, but larger quarters are being fitted up at 142 North Broad Street, Philadelphia, and will be occupied soon. Walter Goodenough, Boston, chief engineer of the Stone & Webster Engineering Corporation, is general manager of the new shipbuilding plant and has under him a large staff of engineers and department executives who have been recruited from the staffs of the Stone & Webster Engineering Corporation, the American International Corporation and the New York Shipbuilding Corporation.

Many Shops Will Fabricate

Fifty steel shipways will be erected on the 900-acre Hog Island site as soon as material can be obtained from the fabricating shops. A large number of such shops have been engaged to fabricate the steel for the ships, which will be assembled as rapidly as modern facilities and the ingenuity of the corporation's engineers can make possible. After the first ship is launched, one will follow about every alternate working day. These will be 5000-ton ships. Although the corporation's contract with the Emergency Fleet Corporation at present provides for only 50 ships, additional contracts will follow as soon as the necessary funds have been authorized by Congress.

Equipment for the new yard is being purchased rapidly. A contract has just been closed with the American Hoist & Derrick Co., St. Paul, Minn., for 500 stiff-leg derrick of 5-ton capacity at 80-ft. radius and 500 hoisting engines. The cost of this equipment is \$2,400,000, and it is the largest single order of its kind ever placed in this or any other country. Eight derricks will be used for each shipway, and the remainder will be utilized for other work in the yard. The corporation's first plans provided for the utilization of overhead traveling cranes, but it was found impossible to obtain a sufficient number of such cranes within the time specified. Deliveries of the derricks and hoisting engines will be begun Dec. 1. The corporation will also purchase about \$150,000 worth of pumps and \$68,000 worth of air compressors, having received bids on these last week. Not much plate-working machinery will be required, as 85 per cent of the steel entering into the construction of these ships will be fabricated in shops scattered all over the country.

Plant Will Be Temporary

The shipbuilding plant will be a temporary structure. Shop buildings will not be erected with the idea of permanency, and buildings will not be erected at all except where absolutely necessary for housing purposes.

The American International Corporation, despite its lack of previous shipbuilding experience, has ample facilities and brains to draw upon for such work. The

corporation was organized in 1915 and one of its avowed purposes was "the enlargement of the system of ocean transportation under the United States flag." The companies controlled by the American International Corporation are the Allied Construction Machinery Corporation, the Allied Machinery Co. of France, the Allied Machinery Co. of America, the Allied Sugar Machinery Corporation, Carter, Macey & Co., Ltd., the China Corporation and the Siems-Carey Railway & Canal Co. Affiliated with the corporation are the National City Bank of New York, Stone & Webster, the New York Shipbuilding Corporation, the International Mercantile Marine Co., W. R. Grace & Co., and the Pacific Mail Steamship Co.

Ship Assembling Plant

It is said that the plans of the Submarine Boat Corporation and the Lackawanna Bridge Co. for the similar ship assembling plant which they will erect on the Newark Meadows have not been worked out so rapidly, but the plant will be built along about the lines the American International Corporation has adopted. In all probability, the Lackawanna Bridge Co. will build the derricks needed for the shipways at this plant, and hoisting engines will be bought wherever they can be procured for quick delivery.

The Merchant Shipbuilding Corporation and the Chester Shipbuilding Co., affiliated companies, are making important additions to their plants at Bristol and Chester, Pa., to take care of Emergency Fleet Corporation contracts for fabricated steel vessels. The steel for these plants will be fabricated by the American Bridge Co. and assembled in the same way as in the American International Corporation and Submarine Boat Corporation plants. The Bristol plant, which was purchased some months ago from the Standard Cast Iron Pipe & Foundry Co., is undergoing large and important changes. Twelve steel shipways, each 420 ft. long, to accommodate vessels of 9000-ton deadweight, are being erected. Present buildings on the property are being rebuilt for their new uses and several new buildings are being put up. The building formerly used as a gray iron foundry is being turned into a pipe shop and when altered will be 125 x 185 ft., one story. The building housing the blacksmith shop and boiler shop will be 60 x 285 ft., one story; the machine shop, 80 x 220 ft., one story; the pattern and joiner shop, 53 x 153 ft., two stories; the power house, which is now 75 x 150 ft., will be tripled in size. The two cast iron pipe foundries, 100 x 464 ft., one story, are being converted into punch and frame-bending shops. Two steel runway sheds are to be rebuilt into a shipwright shed, 94 x 175 ft.; a new joiner shop will be 75 x 300 ft., two stories, and there will be a new storehouse, 200 x 300 ft., three stories, the third floor to be used as a mold loft. There will be several smaller buildings.

New Equipment To Be Added

Twenty-four cranes were in the plant when it was bought and the machine shop was well equipped, but considerable new equipment will be added, some of which has already been purchased. About 100 new machine tools will be bought, 60 of which were bid on last week. The equipment for the new power plant will cost more than \$1,000,000 and will include air compressors, generators, converters, boilers, coal conveyors, steam turbines and electrical equipment of various kinds. Twenty-four revolving traveling cranes with luffing boom each of 10,000 lb. capacity at 91 ft. radius and 30,000 lb. capacity at 54 ft. radius, for shipways, were recently bought from the Edward F. Terry Mfg. Co., New York, and two will be used for each shipway. A contract has also been closed recently with the

Champion Iron Co., Kenton, Ohio, for five gantry cranes with 85 ft. span, and eight locomotive cranes of the Brown-hoist conveyor type. Yard locomotives for handling equipment have also been bought.

The Merchant Shipbuilding Corporation expects to lay the keel of the first fabricated ship on Dec. 1. After the first ship is launched, one will follow every 10 days. This plant has a contract for 40 steel ships, which are to be completed within 18 months. It will be four months from Dec. 1 when the first ship is launched.

All material for these ships, such as engines, boilers, etc., will be purchased from other companies so far as possible in order to expedite delivery to the Emergency Fleet Corporation.

American Merchant Fleet

The Chester Shipbuilding Co. plant at Chester, Pa., was already well equipped when the plans for an American merchant fleet were first made, but everything possible is being done to make possible the rapid construction of ships. A new punch shop, 180 x 510 ft., one story, with one half of the building having a second story to accommodate the mold loft, is being erected; also a new joiner shop, 75 x 250 ft., and a new shipwright shop, 94 x 175 ft., both one story. All buildings are of steel and concrete construction. The Chester Shipbuilding Co. recently purchased the plant of the Duplex Paper Co. on adjoining property and is converting a large building, 200 x 350 ft., one story, into a power house, machine shop, pipe shop and blacksmith shop. New equipment is being purchased, but more will be bought soon. The Chester Shipbuilding Co. has just bought three 10-ton gantry cranes with 85 ft. span and five shop cranes, three of 5-ton, one 7½-ton and one 15-ton capacity from the Champion Iron Co., Kenton, Ohio, for shop purposes.

The shops which are yet to be provided with equipment are the pipe shop, blacksmith shop, machine shop and woodworking shop at both plants.

Sidney A. McLean, who until recently had charge of inside shipbuilding for the Fore River Shipbuilding Corporation, Quincy, Mass., has been appointed works manager by the Merchant Shipbuilding Corporation. W. Averill Harriman, son of the late E. H. Harriman, controls the majority of stock in both the Merchant and Chester companies.

The Fore River Shipbuilding Corporation, Quincy, Mass., which will erect a new plant for the Navy Department, will build 75 torpedo boat destroyers of the 150 which the plan of Secretary of the Navy Daniels provided for. The Union Iron Works, San Francisco, has 40 under way or contracted for, including several which have been under way for some months, and others are being built by the Bath Iron Works, Bath, Me.; the New York Shipbuilding Corporation, Camden, N. J.; the William Cramp & Son Ship & Engine Building Co., Philadelphia, and the Newport News Shipbuilding & Dry Dock Co., Newport News, Va. The new plant to be built by the Fore River Shipbuilding Corporation will be complete in every particular and so far as possible will be independent of other manufacturers in the production of turbines, boilers and other destroyer equipment. A scarcity of gear cutting machines is one serious difficulty that stands in the way of rapid completion of turbines. Many turbines are being built for destroyers by the General Electric Co. and the Westinghouse Electric & Mfg. Co.

The Eastern Shore Shipbuilding Corporation, whose president is R. R. Livingston, engineer, 2 Rector Street, New York, has purchased the plant of the White Shipbuilding Co., Sharptown, Md., and has had plans prepared by the Hamilton & Chambers Co., architects, 29 Broadway, New York, for additional shops to cost about \$150,000. The shipbuilding company will erect the buildings itself. Contracts are said to have been closed for three cargo-carrying vessels, and the yard will be equipped also to do considerable repair work. Mr. Livingston told THE IRON AGE that new equipment for the plant would undoubtedly be bought, but he was not prepared at this time to give details.

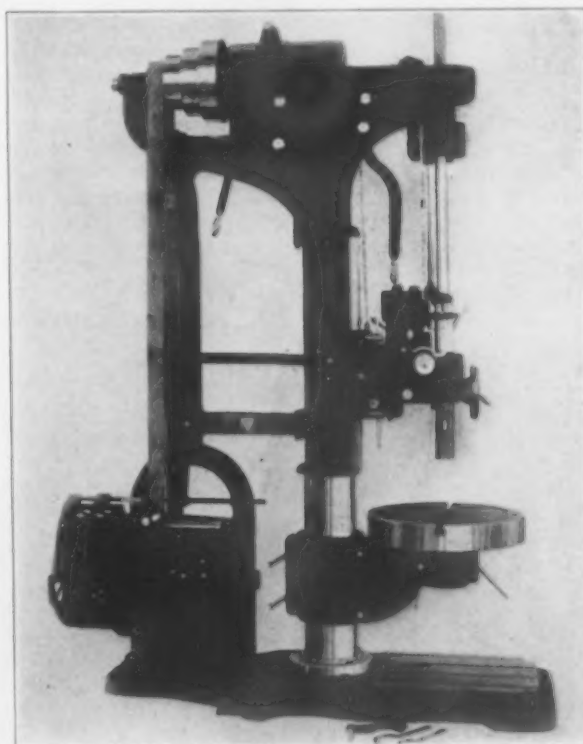
The strike of machinists at the Lake Torpedo Boat Co., Bridgeport, Conn., has been settled through officials of the Navy.

A New 25-In. Upright Drilling Machine

A 25-in. vertical drilling machine having an improved friction quick return has recently been put on the market by the Weigel Machine Tool Company, Peru, Ind. The operating levers are placed in the form of a pilot wheel consisting of four levers, any one of which engages or disengages the feed at will. An automatic stop which is positive in its action can be set to throw out the feed at any predetermined depth.

The base of the machine is heavy and well ribbed underneath to prevent any spring. It has an oil pan of ample size extending entirely around the outer edge. Four T-slots are formed in the base for clamping the work when the drilling is done on the base. The column is tubular in section and has a large bearing for the table arm, as well as a very wide bearing for the sliding head. The table arm has a large bearing on both the hub of the table and on the column. It is raised and lowered by a rack and pinion actuated through a worm and a worm gear. The bore for the hub on the table is large enough to use a compound table without making any change.

The back gear of this machine is of the friction type. It is positive in its action and easily operated by a lever conveniently located at the front of the machine.

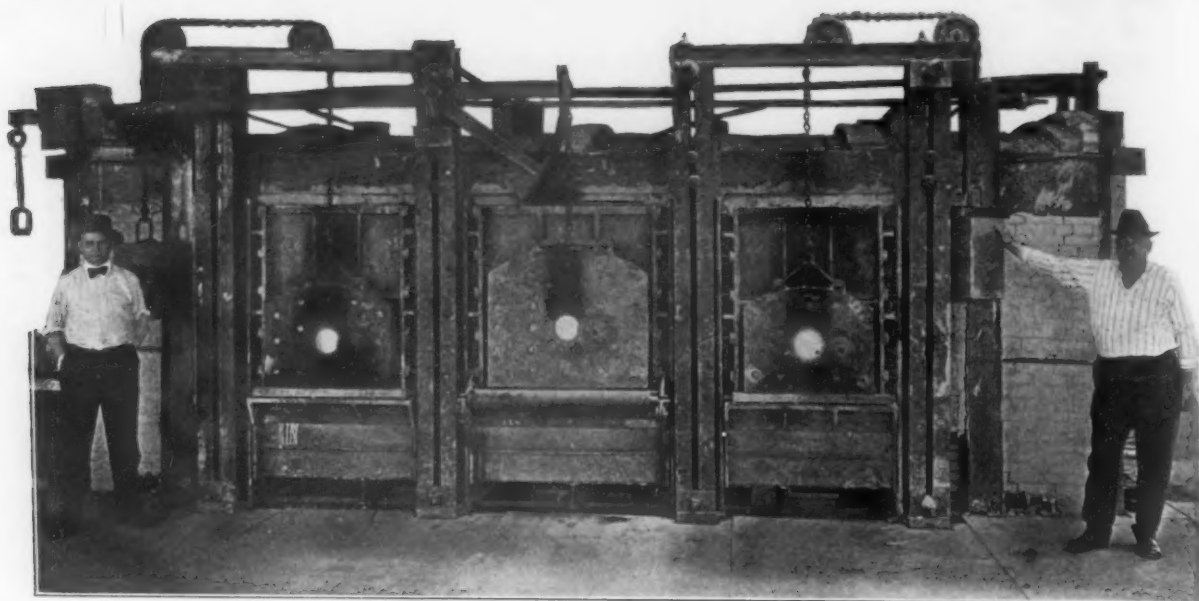


The Grouping of the Operating Levers Into a Four-Lever Pilot Wheel Provides a Ready Means for Engaging the Feed or Throwing It Out

All gears are entirely covered and run in oil tight box, thus insuring good lubrication. The spindle is provided with eight feeds ranging from 0.0040 to 0.0432 in. per revolution, and the changes are obtained by sliding gears. Any feed is easily and quickly obtained by convenient levers and the feed is indicated by a plate attached to the machine.

The machine can be furnished with a friction tapping attachment, which is placed directly on the spindle and has a reverse of 2 to 1 for backing out the tap. It can be quickly disengaged when no tapping is to be done.

The lower cone pulley is entirely covered by a cast housing and the tight and loose pulleys have an adjustable cast guard. A belt shifter is furnished with all machines when desired. This is claimed to be a new feature on drilling machines and saves the operator considerable time in shifting the belt by hand. The machine can also be equipped for direct or belted motor drive.



The 5-Ton Open-Hearth Furnace Gives a Daily Output of 20 Tons of Castings

A CONCRETE FOUNDRY BUILDING

Equipment and Practice of the American Machine & Manufacturing Co., Atlanta, Ga.

A REINFORCED concrete foundry building has been completed at Atlanta, Ga., for the American Machine & Mfg. Co., builder of oil mill machinery and maker of castings. The foundry is equipped to make gray iron as well as steel castings and forms part of a plant which includes a machine shop building, not yet fully completed.

The accompanying plan will give an idea of the departments and apparatus of the foundry. It is noteworthy that the main crane runway of 50 ft. span extends through the building to a yard at each end, openings being provided to allow the 10-ton crane installed to pass. The openings are provided with roller curtains so that they may be closed in times of rain or cold weather. One end of the building is of temporary construction of wood and space is available for an extension of 200 or even 300 ft. as business conditions justify.

A 60-in. cupola is installed and the iron foundry has a daily capacity of 15 tons to operate on special heavy machine, loam castings, chilled rolls and special chilled castings. The iron capacity is large enough to take on contracts to an amount of 10 tons daily of gray iron casting work. In this connection a fireproof pattern vault equipped with the Grinnell automatic sprinkler system has been provided.

A 5-ton McLain open-hearth furnace has been installed and there is space for additional 10 or 20-ton furnace. The stack for the furnace gases is of brick and is built large enough to take care of the additional open-hearth capacity. With the present furnace three-

5-ton heats are obtainable in 10 hr. and 7½-ton heats are found possible when operating on heavy work. The plan is to operate the furnace on two 12-hr. shifts, pouring the heavy work at night, molds for which are made in the day period, and pouring the light work in the day time, giving thus a daily output of approximately 20 tons of steel castings. The machine shop and manufacturing plant will use about 5 tons of these castings per day so that the company may also contract its surplus output of 10 to 15 tons of steel castings per day.

G. S. Evans, formerly of the Lenoir Car Works, Lenoir City, Tenn., is actively interested in the company.

The Iron and Steel Institute's Fall Meeting

The fall meeting of the Iron and Steel Institute was held in London, Sept. 20 and 21. The following was the official program of papers for reading and discussion:

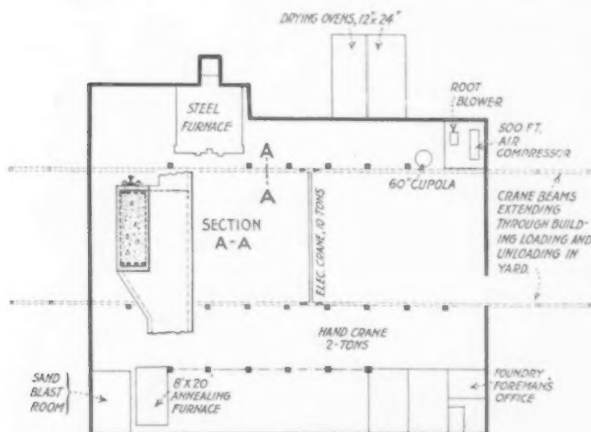
- "Present Practice in Briquetting of Iron Ores," G. Barrett and T. B. Rogerson.
- "Microstructure of Commercially Pure Iron between Ar₁ and Ar₂," W. J. Brooke and F. F. Hunting.
- "The Influence of Heat Treatment on the Electrical and Thermal Resistivity and Thermoelectric Potential of Some Steels," E. D. Campbell and W. C. Dowd.
- "New Impact Testing Experiments," G. Charpy and A. Cornu-Thénard.
- "Heat Treatment of Gray Cast Iron," J. E. Hurst.
- "Effect of Mass on Heat Treatment," E. F. Law.
- "Investigation Upon a Cast of Acid Open-Hearth Steel," T. D. Morgans and F. Rogers.
- "The Acid Open-Hearth Process," F. Rogers.
- "The Eggertz Test for Combined Carbon in Steel," J. H. Whitely.
- "Failure of Boiler Plates in Service and Investigation of Stresses Occurring in Riveted Joints," E. B. Wolff.

Expansion of the British Steel Industry

About \$75,000,000 (£15,000,000) additional capital has been invested in the British steel industry since the war started, according to the report of the British Steel Smelters' Society. Production does not satisfy the needs of the Government, it is stated. The additional plant and the demands of the military authorities have caused a shortage of labor and many men have been brought back from the army to help to supply the deficiency.

The Worthington Pump & Machinery Corporation announces the opening of a new branch sales office in the American Trust and Savings Bank Building, Birmingham, Ala., to take care of a part of the large territory hitherto controlled by the Atlanta office. Edward Stauverman, formerly with the Atlanta office, will be in charge of the Birmingham office.

The Cheever Iron Ore Co., Port Henry, N. Y., is planning for the construction of a new iron ore dock to cost about \$100,000. A. E. Hodgins is general manager.



Plan of Combined Steel and Iron Foundry and Detail of Concrete Column Crane Supports

FABRICATION IN TRANSIT

Decision of Unusual Importance by Interstate Commerce Commission

WASHINGTON, Oct. 2.—The broad principle is laid down in a decision just announced by the Interstate Commerce Commission that a common carrier cannot legally deny fabrication-in-transit service at any given point reasonably well located for such purpose on carload shipments of certain iron and steel articles there to be fabricated into material for the construction of towers, tanks, standpipes, steel riveted pipes and smokestacks, while contemporaneously according such service under tariffs to which such carriers are parties on carload shipments of similar iron and steel articles fabricated at other points for use in the construction of bridges or buildings. Unusual significance attaches to this ruling because of the fact that there is now in prospect a very large increase in the number of fabricating plants in the country to provide material for the building of standardized ships, for the extension of navy yards and naval stations, and for buildings involved in the expansion of numerous manufacturing plants engaged in ordnance work.

The complainant in this case, the Chicago Bridge & Iron Co., maintains a plant at Greenville, Pa., on the line of the Erie Railroad, where it is engaged in fabricating iron and steel articles into material for use in the construction of towers, tanks, standpipes, steel riveted pipes and smokestacks. It alleges, first, that existing schedules, although otherwise construed by the defendant carriers, provide a fabrication-in-transit service at Greenville and, second, that if these schedules do not so provide, the carriers' failure to accord such service is unreasonable, unjustly discriminatory and unduly prejudicial. Reparation therefore is demanded for the refusal of the carriers up to the present time to accord such service. It is further shown that from the time that the complainant's Greenville plant was erected in 1910 until Feb. 1, 1916, when the present rules became effective, the fabrication-in-transit service now sought was accorded by the carriers.

The present transit rules provide for the application of through rates plus a transit charge of 1½ cents per 100 pounds, on certain iron and steel articles, viz., angles, bars, beams, bolts, castings, channels, columns, girders, plates, nuts, rivets, rods, tees, and zebs, shipped in carloads to Greenville, there fabricated into "material for the iron and steel framework or sections of bridges or buildings" and reshipped in carloads. The complainant contended that towers, tanks, standpipes, steel riveted pipes and smokestacks are "buildings" within the meaning of the tariff and for that reason its shipments are entitled to the fabrication-in-transit service. With this view the Interstate Commerce Commission does not agree. The transit rules under consideration, the commission holds, were suspended and withdrawn in the fabrication-in-transit at Greenville, Pa., case, decided some months ago. For this reason reparation is denied.

Concerning the broader proposition, however, that the complainants are entitled to fabrication service at Greenville in view of that accorded competitors at other points, the commission makes a comprehensive ruling of interest to the entire steel trade.

"Iron and steel articles for use in the construction of towers, tanks, standpipes, steel riveted pipes, and smokestacks," says the decision, "are of necessity fabricated at mills far removed from the sites of such structures and it is essentially inexpedient to set up at the destined sites the necessary machinery for fabrication. This is true also of structural iron and steel for use in bridges and buildings, and it is this 'circumstance and condition of things which has warranted the extension of the privilege to this particular industry.'

"Apparently no distinction can be made between the circumstances and conditions surrounding the transportation of complainant's material and those surrounding the transportation of material for use in the iron and steel framework of bridges and buildings. This is true not only of those conditions directly affecting

transportation, but also of the commercial circumstances which bear upon the desirability of a fabrication-in-transit service. The only substantial difference between fabricated material for use in bridges and buildings and fabricated material for use in towers, tanks, standpipes, steel riveted pipes, and smokestacks is the use to which they are put, and it has long been held that rates cannot be predicated upon the proposed use of the commodities transported."

Upon this record the commission decides that while, under the circumstances, the carriers' failure to accord fabrication-in-transit service in the past cannot be held to be unreasonable *per se*, nevertheless, "the failure to accord such service, while contemporaneously according it under tariffs to which defendants are parties on similar iron and steel articles fabricated at other points into like material for use in the construction of bridges and buildings, is and for the future will be unduly prejudicial to complainant and its traffic in violation of section 3 of the act to regulate commerce."

Gun for Removing Open-Hearth Slag

The Rivet Cutting Gun Co., 220 East Second Street, Cincinnati, has recently perfected a flexible gun for digging slag from open-hearth slag pockets.

The apparatus consists of a cylinder measuring 3 x 26 in. in which is an 8-lb. floating piston that strikes a blow on the head of the cutting bar extending in-



Slag Is Dug Out of the Pockets of Open-Hearth Furnaces by an Air-Actuated Cutting Bar 26 In. Long

side the cylinder. The piston is returned by the introduction of air pressure at the bottom through the pipe shown on the outside. The force of the air entering the gun via the air intake located at the top of the cylinder is controlled by the operator by a three-way valve through the air intake port. It is claimed that the operator can deliver either a very light stroke or a very hard blow, and after a little practice an ordinary workman can operate the three-way valve so fast that as high as 125 strokes per minute can be obtained.

The manufacturer points out that by the use of this slag gun no hard physical labor is required and that it will loosen the slag many times quicker than is accomplished in the ordinary method of using a sledge hammer and bar. Attention is also called to the fact that the temperature in the slag pockets of the machine some times runs as high as 150 deg. Fahr., so that workmen cannot stand much physical exertion in a heated atmosphere.

The construction of the tool is very simple and it has no complicated parts to get out of order. An air pressure of 75 lb. and higher is recommended to secure the best results.

Hardening Carbon and Special Steels*

Effect of Chromium, Copper and Nickel on the Penetration of the Hardening—Copper Increases the Depth in Copper Steels

BY L. GRENET

THE difference between the influence of the heat treatment at the surface and in the center of steel pieces, which is very considerable in the case of carbon steels but small in steels in which the hardening effect has penetrated deeply, justifies the stipulation which, for some time past, has been introduced into specifications to the effect that after hardening, but before the removal of the pieces for testing, the ends of certain pieces, such as gun parts, should be cropped.

The minimum rate of cooling required to render the influence of quenching efficacious varies to an enormous extent, according to the quality of the steels concerned. The rate of cooling necessary to secure the hardening of special steels is lower than that necessary to secure the hardening of ordinary carbon steels. The penetrative influence of heat treatment is, therefore, more efficacious in the case of special steels than in carbon steels, and this, as is well known, constitutes one of the chief characteristics of the special steels.

As a further consequence of the ease with which the special steels can be tempered, it is possible to harden certain of them by mild quenching operations such as oil and air tempering, which occasion little deformation or cracking.

The copper steels have already been investigated, notably by Brustlein in France and by Stead in England. The present author has devoted himself more especially to ascertaining the influence of copper on the depth of the hardening effect, particularly in the presence of chromium. His experiments have been made on crucible steels from Firminy. The more interesting results have been summarized in Tables 1, 2 and 3. The following facts have been observed:

hardening on very slow cooling during annealing. (Table 3.)

The addition of nickel to steels containing chromium and copper allows of the depth of the penetrative influence of quenching being increased, but only to the detriment of the property of softening by annealing. Having due regard to the size of the pieces and the use to which they are to be put, there is an advantage to be derived from the introduction of a more or less high proportion of nickel into steel.

The simultaneous addition of copper, nickel, and chromium to a steel permits of the easy preparation of steels which possess a tendency to deep penetration of the hardening effect sufficiently marked to render the air-hardening of large enough pieces (for example, gearings) efficacious, without such steels losing the property of becoming softened by the orthodox annealing processes employed in the case of ordinary carbon steel. (See Table 3.) These two properties, (a) depth of penetration of hardening effect, and (b) facility for softening on annealing, can be obtained among steels the composition of which may vary within fairly wide limits.

According to the tests carried out by the author the chromium-copper and chromium-nickel-copper steels possess, after hardening and tempering, practically the same mechanical properties (tensile and impact) as chromium-nickel steels having approximately the same carbon percentage and the same penetrative capacity for hardening. (Table 4.) The chromium-copper steels, however, assume, on quenching at somewhat low temperatures, a rather coarser grain on fracture than that exhibited by nickel-chromium steels; there is therefore more danger of their becoming burned.

Steels Containing High Percentages of Chromium

The special steels most commonly employed generally contain more nickel than chromium, because the somewhat violent action of chromium, which is liable to lead to cracks while quenching, is dreaded. The author conceives it useful to recall a few statements he made on a former occasion in this connection.

Table 1—Analyses of the Steels Investigated in Percentages

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11	No. 12	No. 13	No. 14	No. 15
Carbon.....	0.59	0.57	0.31	0.37	0.36	0.38	0.34	0.35	0.35	0.40	0.62	0.51	0.37	0.38	0.47
Silicon.....	0.19	0.33	0.34	0.14	0.14	0.12	0.20	0.15	0.18	0.16	0.17	0.23	0.17	0.23	0.20
Manganese.....	0.54	0.60	0.46	0.26	0.20	0.19	0.28	0.21	0.22	0.24	0.61	0.38	0.57	0.36	0.36
Chromium.....	1.82	1.77	1.46	1.74	1.61	1.49	1.60	1.52	1.38	1.69	1.51	1.49	0.41	0.47	1.84
Nickel.....	0.00	0.00	0.00	0.00	2.16	2.90	3.93	2.02	2.60	2.52	2.37	1.80	2.62	1.60	3.30
Copper.....	0.00	1.15	0.00	4.14	0.00	0.00	0.00	2.40	2.15	4.04	0.00	1.00	0.00	1.40	1.24

These steels contain traces only of phosphorus and sulphur. They all underwent the transformation on heating below 775 deg. Quenched in water from a temperature of 790 deg., small parts showed Brinell hardnesses of 600 and upwards.

When, apparently, the percentage of nickel is below 5 per cent, steels containing above 4 per cent of copper forge badly. Confining the observations to forgeable steels, copper, by itself, while slightly increasing the depth of penetration of the hardening effect, does not increase it sufficiently to confer on steels the property of air tempering, even when small parts, such as 10 millimetre square bars, are concerned. If the amount of nickel that could be introduced into the steel be limited to 4 per cent the same conclusions would be reached.

In the presence of chromium the copper increases, fairly noticeably, the depth of the penetration of the hardening effect to the extent of rendering the employment of chromium-copper steels a matter of practical interest. (Table 2.) It has only been upon steels containing both chromium and copper that the more extended experiments, of which an account is about to be given, have been made.

None of the chromium-copper steels prepared by the author possess the property of undergoing transformation (the γ to α transformation) at low temperatures, nor, therefore, that of hardening when the cooling is exceedingly slow, whereas, chromium-nickel steels rather high in nickel (4 per cent of nickel and 1.5 per cent of chromium) possess this property. (See Table 2). The addition of 4 per cent of copper to a steel (No. 10) containing 2.52 per cent nickel and 1.59 per cent chromium does not likewise communicate to it the property of

The rate of cooling required to lower the transformation temperature in the neighborhood of ordinary temperatures, that is to say, in order to produce hardening, varies within enormous limits. It is very difficult to ensure uniform cooling during quenching, even when all the factors acting on the rate of cooling are rigorously defined. It is similarly very difficult, when metals which require a rapid rate of cooling are treated, to ensure a uniform degree of hardening.

If, on the contrary, metals which undergo energetic hardening on air-cooling are employed, it is obvious that when they are cooled in a liquid in which the cooling effect is more rapid the hardening will still be energetic and uniform, if the conditions of the cooling vary.

Steels containing at least 1.4 per cent chromium and a little copper or nickel are, in these circumstances, of a kind that can be quenched in a liquid between the temperature of 120 deg. and 350 deg. (real colza oil does well) without the energy of the cooling varying much, and in these circumstances there is not much fear of cracks developing.

Generally speaking pieces of medium thickness (30 mm. or less) are susceptible of being so treated, if made from air-hardening steels. Such metals soften very well on ordinary annealing and after annealing

*From a paper presented at the May meeting of the Iron and Steel Institute in London. The author is a metallurgist at Firminy, France.

are easy to machine. Naturally if it be desired that the hardening effect should penetrate to the core in very thick pieces, or, if air-hardening is to be adopted, metals should be employed which have a greater susceptibility to the penetrative effect of hardening.

Table 2—Influence of Copper on the Depth of Hardening in Chromium Steels Not Containing Nickel

Treatment	BRINELL HARDNESS NOS.			
	Steel No. 1	Steel No. 2	Steel No. 3	Steel No. 4
Cooled in still air from 790° on sq. bars 10x10 mm.	312	512	....	477
Cooled in still air from 790° on sq. bars 20x20 mm.	241	364	....	....
Cooled in still air from 790° on sq. bars 30x30 mm.	234	255	....	....
Cooled in still air in bundles of four bars 30x30 mm.	....	....	....	269
Cooled in still air at 820° on sq. bars 10x10 mm.	340	555	....	477
Cooled in still air at 820° on sq. bars 20x20 mm.	255	512	....	477
Cooled in still air at 820° on sq. bars 30x30 mm.	261	255	....	302
Cooled in still air in bundles of four bars 30x30 mm.	....	....	....	269
Cooled in still air at 870° on sq. bars 10x10 mm.	555	555	207	555
Cooled in still air at 870° on sq. bars 20x20 mm.	444	600	....	512
Cooled in still air at 870° on sq. bars 30x30 mm.	321	600	....	512
Cooled in still air in bundles of four bars 30x30 mm.	....	....	....	444
Annealed at 820 deg.	163	217	187	170

From Table 2 it will be seen that the chromium steels not containing copper (Nos. 1 and 3) harden only with difficulty on cooling in air. Steel No. 3, even when quenched in the forms of bars 10 mm. sq. from a temperature of 870 deg., only possess a hardness of 207. Before steel No. 1 attains distinct hardening in air-cooled bars of 10 and 20 mm. sq. section a temperature of 870 deg. has to be reached. With bars 30 mm. sq. air-quenching, even from 870 deg., is not very effectual. On the other hand steels Nos. 2 and 4, which contain copper and chromium, when in bars of 10 mm. section, become air-hardened when a temperature of 790 deg. has been reached. Square bars 20 x 20 mm. air-harden after heating to 820 deg. and bars 30 x 30 mm. harden in air after heating to 870 deg. In the case of steel No. 4 it has even been established that, on heating to a temperature of 800 deg. bundles of even four bars each 30 x 30 mm. sq. can be effectually air-hardened. It will be seen that the presence of copper does not prevent softening on annealing at a high temperature.

Table 3—Influence of Copper on the Depth of Hardening in Chromium-Nickel Steels

Treatment	BRINELL HARDNESS NOS.					
	Steel No. 5	Steel No. 6	Steel No. 7	Steel No. 8	Steel No. 9	Steel No. 10
Cooled in still air from 790° in bundles of four bars 30x30 millimetres square.	269	321	387	340	418	477
Cooled in still air from 820° in bundles of four bars 30x30 millimetres square.	286	321	418	402	477	512
Cooled in still air from 870° in bundles of four bars 30x30 millimetres square.	321	350	444	444	477	477
Annealed at 820°.	179	207	269	267	207	196

From Table 3 it will be seen that the chromium-nickel steels not containing copper (Nos. 5 and 6), which soften well on annealing, do not possess the property, in thick pieces, of air-hardening.

Steel No. 7, containing chromium and nickel but no copper, air-hardens well but does not soften well on annealing. Steels 8, 9 and 10, containing chromium, copper and nickel, air-harden even in thick pieces and soften well on annealing.

A Summary

Copper increases the depth of the hardening effect in steels.

The influence of copper in the presence of chromium is marked. One per cent of copper suffices to confer on steels containing 1.5 per cent of chromium an interesting degree of capacity for sustaining the hardening effect in point of depth.

The action of the copper is more limited than that of

nickel. All the chromium-copper steels prepared by the author, containing less than 3 per cent of nickel, soften on annealing at high temperatures, and consequently do not harden on quenching when the rate of cooling is very slow.

The simultaneous employment of copper, nickel and chromium allows of semi-hard steels being prepared which can be hardened by air-cooling on largish pieces and yet softened by the ordinary annealing methods used for carbon steels. The limits of chemical composition within which such steels should fall are wide enough to render their manufacture easy.

The chief influence of copper, like that, indeed, of other special elements, is to increase the depth of the penetrative influence of the quenching, and consequently the efficacy of heat treatment in the interior of the pieces subjected thereto.

Apart from this influence on the depth of penetrative influence of quenching the author has failed to detect any other useful effect of copper on the properties of steel.

Table 4—Tensile and Shock Tests on Chromium-Nickel Steels and on Chromium-Copper Steels With or Without Nickel

Steel	Temperature of Tempering, Deg.	Elastic Limit, Kg. per Sq. Mm.	Tensile Strength, Kg. per Sq. Mm.	Elongation per Cent	Resilience (Charpy Drop Weight)	Brinell Hardness Nos.	Grain of Shock Test Bar
No. 2. Copper and chromium but no nickel.	450 600 650	..... ..... .....	..... ..... .....	..... ..... .....	2.40 12.86 19.13	418 302 269	Crystalline Fibrous Fibrous
No. 7. Chromium and nickel but no copper.	450 600 650	Not recorded 91.0 68.3	158.0 102.3 88.3	7.0 15.0 17.5	9.10 18.30 26.60	387 286 241	Crystalline Fibrous Fibrous
No. 9. Chromium, copper, and nickel.	450 600 650	Not recorded 98.4 80.2	155.0 107.0 89.0	7.0 11.0 14.0	6.20 11.90 21.70	430 302 255	Crystalline Fibrous Fibrous
No. 11. Chromium and nickel but no copper.	450 600 650	149.0 107.8 91.7	164.1 125.7 109.0	5.0 10.0 13.0	2.40 7.20 15.60	418 340 302	Crystalline and fibrous Fibrous
No. 12. Chromium, copper, and nickel.	450 600 650	Not recorded 104.2	166.2 112.4	4.0 10.5	4.30 18.30	302 302 269	Crystalline Fibrous Fibrous
No. 13. Chromium and nickel but no copper.	450 600 650	Not recorded 78.6	130.9 90.8	7.0 13.5	13.80 24.2 33.2	340 255 228	Crystalline crystals Fibrous
No. 14. Chromium and copper but no nickel.	450 600 650	132.3 85.5	134.6 96.4	7.0 11.0	9.1 24.2 28.3	340 256 228	Crystalline Fibrous Fibrous
No. 15. Chromium, copper, and nickel.	200	Not recorded	219.0	6.0	.....	.....	.....

Steels Nos. 2, 7, 9, 11, 12, 13 and 14 were tested in bars 160 mm. long, cut from a forged bar of 30 x 30 mm. square section. After treatment they were either notched for the resilience tests (the notch being a round one of 8 mm. diameter) or machined to round bars 13.8 mm. in diameter and 100 mm. long between punch marks, for the tensile tests. The elastic limit was determined roughly by observing the slowing down in the rate of the rise of the mercury column. The Brinell hardness was ascertained by means of a ball 10 mm. in diameter at a pressure of 3000 kg. and applied to the surface of the bars used for the shock tests. Both the shock and tensile test-pieces were quenched, from a temperature of 800 deg., in oil at about 50 deg. They were kept for about half an hour at the tempering temperature, after which they were quenched in cold oil.

As an exception the tensile test-piece of steel No. 15 was taken from a forged round of 20 mm. diameter. It was completely turned down, before testing, to a diameter of 13.8 mm. It was cut to 100 mm. length between punch marks and after machining was quenched from 800 deg. in oil at 150 deg. and tempered for one hour at 200 deg. The tests shown in this table show the properties of steels containing copper to be practically the same, both on quenching and tempering, as those of steels not containing copper.

The Diamond Mfg. Co., Pittston, Pa., is moving to Wyoming, Pa., where it will occupy a larger plant, the main shop of which is 60 x 160 ft., and equipped with the latest machines for the perforation of metals. The company will also operate at Wyoming a brass and bronze department handling metals of all alloys. In the near future, the company expects to install a rolling mill, in which it will not only make its own billets, but will roll them and furnish sheets to the trade. Growth of the business necessitated the change.

Rapidly Creating New Merchant Marine

Many Vessels Now Under Contract and Some Will Soon Be in Service—Rates of Compensation for Requisitioned Property Announced

WASHINGTON, Oct. 2.—The Emergency Fleet Corporation now has under construction 1039 ships, with a total dead-weight capacity of 5,924,700 tons, and as soon as the pending deficiency appropriation bill is signed by the President additional contracts will be placed aggregating 5,000,000 tons, according to a statement made public by Rear Admiral Capps, general manager of the corporation.

During the past two months the Emergency Fleet Corporation has awarded contracts for 118 wooden vessels of 3,500 tons dead-weight capacity each to 27 different shipyards. There had previously been awarded contracts for 235 wooden vessels of similar type to the above and for 58 vessels of composite construction, thereby making a total award to date of 411 wooden and composite vessels of an aggregate dead-weight tonnage of 1,460,900.

The designs for machinery have been completed for the manufacture of engines, boilers and other articles of equipment for these vessels, for which the facilities available of machine shops and boiler works throughout the country have been availed of. Specifications have been prepared and negotiations outlined and initiated for the assembly and installation of machinery in wooden vessels, the most of which have been or are being constructed as "hulls only."

Great difficulty has been experienced on the Atlantic coast in obtaining suitable lumber for these ships, and it is expected that there will be greater delay in their completion than was expected when this movement was begun, notwithstanding every possible effort on the part of the corporation and its contractors.

Since Aug. 1 there have been awarded contracts for 155 steel cargo vessels of 1,076,800 tons dead-weight tonnage, distributed among six shipyards. The most important of these contracts are for vessels of the so-called fabricated type, and special shipyards are being prepared for them.

Third Government Yard

The Shipping Board announces the signing of the formal contract for the third Government owned shipyard, which has been awarded to the Merchant Shipbuilding Corporation. Unlike the contracts with the American International Corporation and the Submarine Boat Corporation, this contract covers vessels of 9000 tons each, 40 of which are embraced in the initial order. The estimated cost of these vessels will be about \$150 per ton and the expense of fitting up the yard will be in the neighborhood of \$20,000,000. The preliminary orders under the three contracts now aggregate 140 ships, but will be increased to approximately 400 as soon as Congress has provided the necessary money.

Contracts for the boilers and machinery and steel construction of these vessels have already been placed, and the contractors are actively at work in the preparation of the sites for the assembling of these ships. The best efforts of the Emergency Fleet Corporation are devoted to expediting these great shipbuilding projects.

Previous to Aug. 1 70 steel cargo vessels of 587,000 tons total dead-weight capacity had been contracted for. These vessels were distributed among 10 shipyards. Therefore, at the present time the total number of steel vessels under construction for the United States is 225, with a total aggregate dead-weight tonnage of 1,663,800.

Requisitioned Vessels

By proclamation of Aug. 3, 1917, the Fleet Corporation, under authority delegated by the President, under the provisions of the emergency act approved June 15, 1917, requisitioned all vessels under construction in the shipyards of the United States of 2500 tons dead-

weight capacity and above. By this act the United States acquired a total number of 403 vessels, determined by the progress reports obtained from the various shipyards to be actually under construction; in many cases, where keels had not actually been laid, engines, boilers, equipment and materials, all of which were also requisitioned, are in various stages of progress; and in comparatively few cases contracts existing for vessels not actually begun, which may or may not be proceeded with, as the merits of each case, compared with what is desirable construction, are considered.

The total dead-weight tonnage under construction thus acquired, and on which orders have been issued to proceed with the maximum expedition, exceeds 2,000,000 tons dead-weight.

There are now under construction for the Emergency Fleet Corporation:

Type of Vessel	Number of Vessels	Total Dead-weight Tonnage
Wood	353	1,253,900
Composite	58	207,000
Steel	225	1,663,800
Requisitioned	403	2,800,000
Grand total	1,039	5,924,700

In addition to the above Congress in a pending bill is authorizing the construction of additional vessels whose total dead-weight capacity will be nearly 5,000,000 tons. Plans for the major portion of these additional vessels are now in course of preparation and many of them will be of special types adapted to particular necessities of war, and while substantially cargo carriers, will have much greater speed than the cargo vessels now under construction.

Regulating Supply of Material

The corporation has ascertained from the builders of requisitioned vessels their demands for structural steel, machinery and various items of equipment and is endeavoring to regulate the supply of these items to provide for the individual needs of the shipbuilders in accordance with their program of capacity, so far as the country's resources are available. And it is apparent that with the similar needs of the naval service and the War Department, every mechanical resource of the United States, with considerably increasing development will be necessary for the realization of this program and what must follow in continuation of it.

With the passage of the pending bill, the Congress will have authorized \$1,799,000,000 for the Shipping Board and the Emergency Fleet Corporation and the actual appropriations made, including those in the pending bill, reach a total sum of \$1,085,000,000.

The realization of the plans of the Shipping Board will mean the complete rehabilitation of the American merchant marine in the foreign trade. The United States has to-day 458 ships of over 1,500 dead-weight tons each with an aggregate tonnage of 2,871,359 either engaged in or capable of participating in foreign trade. There are also 117 ships of a tonnage of 700,285 of German and Austrian origin that have been taken over and put into the overseas trade. The 400 steel ships of more than 2,000,000 tons which have been commandeered and are now being completed under contracts in American yards will add another important factor and with the tonnage contracted for by the Emergency Fleet Corporation there will be a total by the end of 1918 of more than 1,600 ships aggregating 9,200,000 tons to carry the foreign commerce of the United States as compared with the overseas marine of 1,614,222 tons on June 30, 1914, scarcely a month before the European war began. Even these large figures do not represent the completed work of the Shipping Board and they must be increased by approximately 5,000,000, which will be built under the

pending appropriation bill; hence it would appear that when the board's plans have been fully worked out, the representation of the United States in the foreign trade will exceed 14,000,000 tons.

Rapid Increase in Size

The tonnage referred to includes only cargo vessels in the overseas trade and is exclusive of that engaged on inland waters, unsuitable coastwise ships and small craft operating along the coast and in bays and harbors. It is therefore practically certain that within the next two years the American merchant marine will show an increase of nearly 150 per cent as compared with its status on July 1, 1916. In point of efficiency, however, the increase will be much greater, as practically all the additions will be cargo carrying vessels of modern design of fair speed and with thoroughly up-to-date equipment.

The speed with which construction work is now proceeding and the harmony existing between the Shipping Board and the Emergency Fleet Corporation since their reorganization have greatly impressed Congress and there is every disposition to grant all the money that can be utilized for ship construction. The Congressional leaders are especially pleased with the early deliveries guaranteed in the contracts already made. The fleet in prospect is already becoming a reality. Several of the commandeered ships are now taking cargo, and others will leave the ways in increasing numbers with each succeeding month. The ships for which the Shipping Board has contracted are under construction and the first launching is expected within 60 to 90 days. These vessels will be rushed to completion and will be closely followed by others in increasing numbers. Both the board and the Congressional leaders believe that by early spring a sufficient number of vessels will have been added to our overseas marine to render the work of the submarines negligible.

The U-boat warfare is now at the lowest ebb reached since it was begun last February. According to cabled reports received here, there were sunk by mines or submarines during the week ending Sept. 22, but 13 British merchantmen of 1600 tons and over and only two vessels of less than 1600 tons. In the aggregate, this is the smallest number of vessels destroyed during any one week since the submarine campaign was undertaken. The smallest previous aggregate was during the week ending Aug. 12, when 14 vessels of 1600 tons and two of less than 1600 tons were destroyed. During the past month there has been a steady decline in the destruction of British merchantmen, both in the number of vessels and aggregate tonnage.

Rates of Compensation

The Shipping Board has announced the rates of compensation to be paid to the owners of vessels requisitioned under the proclamation of Aug. 3. They are as follows:

Cargo boats and tankers.—Over 10,000 tons dead-weight capacity, Government form time charter, \$5.75 per dead-weight ton; 8001 tons to 10,000 tons, \$6; 6001 to 8000, \$6.25; 4001 to 6000, \$6.50; 3001 to 4000, \$6.75; 2500 to 3000, \$7.

Vessels of speed in excess of 11 knots to be allowed 50 cents per ton dead-weight per month for each knot or part of a knot over 11 knots.

For passenger steamers the board adopted a two-fold basis of classification, Class A consisting of steamers with a capacity of over 150 passengers, and Class B consisting of steamers with a capacity of from 75 to 150 passengers. Steamers falling in both classes are further classified according to speed. The rates for passenger steamers are as follows:

Class A.—Ten to 11 knots, Government form time charter, \$9 per ton gross register; 12 knots, \$9.50; 13 knots, \$10; 14 knots, \$10.50; 15 knots, \$11; over 15 knots, \$11.50.

Class B.—Ten to 11 knots, Government time charter, \$8 per ton gross register; 12 knots, \$8.50; 13 knots, \$9; 14 knots, \$9.50; 15 knots, \$10; over 15 knots, \$10.50.

In announcing the requisition rates, Bainbridge Colby of the Shipping Board made the following statement:

The foregoing rates will become operative on Oct. 15, 1917. The vessels embraced in the requisition, except in so far as actually required for Government service, will be left in the hands of the present owners to be operated for Government account, but subject at all times to such disposition as the board may direct.

A certain number of the requisitioned vessels, which are required for the continuing and exclusive service of the Navy and Army, will be taken over on a bare ship basis. The rate of hire on this basis has been fixed by the board at \$4.15 per dead-weight ton for cargo boats, and \$5.75 per ton gross for passenger steamers of 11 knots speed, with an additional allowance of 50 cents per ton for each knot in excess of 11 and up to 16 knots.

All the foregoing rates are tentative. The board will carefully examine the results of operation under the requisition rates and from the results, as certified by expert examiners, will determine upon such revisions as fair and equitable treatment of the owners of the requisitioned vessels may require. Revisions will be made, if reasons therefor are found to exist, at intervals of not more than 90 days.

As to insurance, the Government will assume the war risk, and in some instances, the marine risk as well. In cases in which for any reason it is more convenient for the Government to assume the marine risk, the usual rate for each insurance will be deducted from the charter hire.

Edward F. Carry, a car manufacturer of Chicago, has been appointed director of operations for the Shipping Board. He will be immediately in charge of the operation of the Government's merchant fleet and will name three assistants, one each to direct operations on the Atlantic, the Pacific and the Gulf. Mr. Carry is now a member of the Wage Adjustment Board recently appointed by the Shipping Board to handle labor disputes. The active work of the director of operations will begin Oct. 15, when the Government will formally take over merchant vessels about to be requisitioned.

W. L. C.

Large Steel Companies Grant 10 Per Cent Advance

During the past week many of the leading steel companies announced a general advance of 10 per cent in wages, effective from Oct. 1, the same as given out recently by the United States Steel Corporation. These include Republic Iron & Steel Co., Sharon Steel Hoop Co., Brier Hill Steel Co., Youngstown Sheet & Tube Co., Valley Mold & Iron Corporation, Shenango Furnace Co., Sharpville, Pa.; Claire Furnace Co. and Ella Furnace Co., at West Middlesex, Pa.; National Malleable Castings Co., Sharon, Pa.; Cambria Steel Co., Johnstown, Pa., employing about 18,000 men, and LaBelle Iron Works, Steubenville, Ohio.

Dedication of McKinley Memorial

Friday, Oct. 5, will be observed as a holiday in the Mahoning Valley when the McKinley Memorial building at Niles will be dedicated and the statue of the martyred president unveiled. Former President W. H. Taft, Senators Pomerene and Harding and Governor Cox will be the principal speakers.

The General Electric Co., East Lake Road, Erie, Pa., has commenced the erection of additions to its local works to cost about \$1,850,000. The structures will consist of a two-story machine shop, about 240 x 800 ft., to cost \$750,000; seven-story pattern shop, 75 x 300 ft., costing about \$800,000; and one-story foundry, 300 x 300 ft., costing \$300,000, to specialize in the production of gray iron castings. The Henry Shenk Co., Twelfth Street, has the contract for erection.

The Atlas Crucible Steel Co., Dunkirk, N. Y., specializing in the manufacture of crucible tool steel, is planning for extensive additions in its plant to increase the present capacity. The extensions will include a new rolling mill, machine shop, laboratory, transformer station and other structures.

The Dunham Co., located at Berea, Ohio, since 1859, has moved its general offices to 801-804 Hippodrome Building, Cleveland. The foundry and other plant will remain at Berea.

SAFETY SURVEY MADE

Engineers Appointed and Assigned to Government Plants

The members of the United States Employees' Compensation Commission, soon after they took office last March, began to appreciate that in order to administer the compensation act satisfactorily, it would be necessary for them to know the conditions with regard to hazards in various Government plants. The commission held a conference with L. R. Palmer, president of the National Safety Council, an organization which includes in its membership some 3200 of the leading industries and nearly all the safety engineers in the United States. A plan for a safety survey of Government plants was agreed upon and C. W. Price, field secretary of the National Safety Council, was made director of the survey. The country was divided into six districts with six district directors, men of wide experience and well equipped to bring to the Government plants the valuable experience of the large industries which have done efficient work in accident prevention. Under these district directors were appointed 25 safety engineers to assist in making the survey, all having tendered their services to the Government without salaries. The directors of the survey as a rule were cordially received and in navy yards, arsenals and other plants commandants and officials expressed their interest in the movement and their appreciation of the necessity of adopting better methods of promoting safety. It was found that Government plants were as a rule far inferior in safety regulations to private industrial works, largely because Government plants have been outside of insurance and state inspection.

As a result of the survey, it was decided that an experienced safety engineer should be placed in charge of each of the important navy yard plants of the Government and this decision has been heartily approved by Assistant Secretary of the Navy Roosevelt. Thirteen engineers of high character and possessing a thorough knowledge of safety work, as well as experience in organizing and promoting it, have been appointed as follows, the name of the new post and previous employment being given in each case:

Capt. Howard Tilson, Frankford Arsenal, Frankford, Philadelphia; formerly with Conkling, Price & Webb, Chicago.

J. L. Price (Box 212, Albany, N. Y.), Watervliet, Sandy Hook and Picatinny Arsenals, address Watervliet, N. Y.; formerly with Anaconda Copper Mining Co., Butte, Mont.

Russell H. L. Guerrant, Rock Island Arsenal, Rock Island, Ill.; formerly assistant casualty manager American Steel Foundries, Chicago.

Herman Behr (21 Falmouth Street, Belmont), Springfield and Watertown Arsenals, address Watertown, Mass.; formerly technical assistant director American Museum of Safety, New York.

Chester E. Rausch, Portsmouth Navy Yard, Portsmouth, N. H.; formerly with Massachusetts Employees' Insurance Association.

Thomas Stanion, Boston Navy Yard, Charlestown, Mass.; formerly assistant superintendent White Sewing Machine Co., Cleveland.

Raymond Heath, Washington Navy Yard, Washington, D. C.; formerly in National Compensation Service Bureau, having charge of inspection and safety work in New Jersey.

Kenneth E. Berray, Charleston Navy Yard, Charleston, S. C.; formerly with Pickands, Mather & Co., Cleveland.

A. H. Lintz, Norfolk Navy Yard, Norfolk, Va.; formerly assistant to superintendent in construction of new coke by-product plant, American Steel & Wire Co., Pittsburgh.

Clarence E. Ralston, Mare Island Navy Yard, Vallejo, Cal.; formerly with the Jones & Laughlin Steel Co., Pittsburgh.

Frederick T. Crossley, Bremerton Navy Yard, Puget Sound, Wash.; formerly with the Mutual Fire Insurance Co., Boston, as inspector in fire prevention work.

Oliver J. Smith, League Island Navy Yard, Philadelphia; formerly manager Chicago office National Workmen's Service Bureau.

Albert S. Regula, New York Navy Yard, Brooklyn; formerly technical assistant to the director, American Museum of Safety, New York.

Although the directors are just starting in their work some progress has already been made since the

inauguration of the survey. This was particularly true in the Brooklyn Navy Yard, where in a few months the number of accidents has been decreased nearly 40 per cent.

Canada Worried by United States Embargo

TORONTO, Oct. 1.—The serious situation developing in Canada as a consequence of the United States embargo on export, except under licenses, of pig iron, iron and steel plates, chrome nickel steel, boiler tubes, steel billets, tin plate and other raw materials of iron and steel manufacture was discussed last week with the Minister of Trade and Commerce, Sir George Foster, by a representative deputation of Canadian iron and steel manufacturers at Ottawa, Canada. The Washington embargo prevents the importation into Canada of these basic requirements of the industry unless it is shown they are necessary for munitions work or other win-the-war purposes. The increased war order business of the United States has placed a drain on the limited supplies hitherto available, and Canada's difficulties in securing iron and steel material from across the border are now greater than ever. The shortage of raw material for domestic use threatens to cause a temporary shutting down of some Canadian plants, or at least a restricted output and short shifts. That would materially affect the whole industrial prosperity of Canada. It is possible that steps will be taken under Government supervision to conserve and co-ordinate iron and steel supplies and secure as far as possible a distribution of the limited supplies obtainable, covering a program for the next six months or so. A Dominion controller of steel and iron may be appointed for this purpose, with duties analogous to those of the Canadian fuel controller. Meanwhile it was decided to secure an inventory of immediate Dominion requirements, with a view to making representation to Washington, and also to ascertain the needs for co-operative action along drastic lines.

New Penn Seaboard Foundry

The Penn Seaboard Steel Corporation, Philadelphia, will build a new foundry at Chester, Pa., 95 x 380 ft., one story. Plans have been drawn and contracts soon will be let. The building will be of steel and concrete with steel sash and tile roof. It will be equipped with three 30-ton, 75-ft. span cranes of the standard bridge type. The new foundry is to take the place of the property which the Penn Seaboard Steel Corporation recently sold to the American Locomotive Co., which was formerly known as the Seaboard Steel Casting Co. The new foundry will adjoin the Penn Steel Castings & Machine Co. plant of the Penn Seaboard Steel Corporation. The corporation has two other plants, one at New Haven, Conn., formerly the National Steel Castings Co., and another at Newcastle, Del., formerly known as the Baldt Steel Co. In all three plants the corporation has 15 open-hearth furnaces, and there will be no increase in furnace capacity on account of the new foundry.

The efficiency of galvanized iron fire doors made by the Edwards Mfg. Co., Cincinnati, was demonstrated at a recent fire on the Locust Street pier of the Baltimore & Ohio Railroad, Philadelphia. The fire destroyed the roof of the pier, together with six automobiles and a pile of lumber in storage. The doors remained in position and, with the exception of the overhead shaft sagging down approximately one ft. in the center from excessive heat and the melting and warping of malleable iron gears in some cases, freight and passenger cars on adjacent tracks were not damaged.

The Columbia Steel & Shafting Co., Pittsburgh, has established a direct branch sales office in New York City at 295 Broadway, in charge of Tracy F. Manville as district manager of sales. Mr. Manville has been identified with the finished steel industry for a number of years and for the past three years has been associated with the company's Eastern sales department at Boston.

Foundry Meetings in Boston Last Week

A Notable Exhibition and Important Papers,
Many Having a Bearing on War Problems,
Feature the Annual Gathering This Year

HOW important Foundry Week is to the foundry industry is indicated in the subjoined account of the technical meetings and of the exhibition of foundry equipment and machinery held in Boston last week. A number of the papers read before both the American Foundrymen's Association and the American Institute of Metals, the latter dealing with non-ferrous rolling mill and foundry questions had special application to war problems. One of the contributions was a treatise on making cast-iron shells, of which it appears large quantities are at present being made by France, and another told of the steel-making practice of one of our arsenals in making castings required to meet the demand of portability and resistance to shock. A notable session on malleable practice marked the week, and an advanced step was made in the movement to bring about standard cost accounting in foundries. Finally mention should be made of the stand which the American Foundrymen's Association took in passing resolutions looking to the formation of a War Service Bureau of the association to assist the Government, if co-operation is sought, in the conduct of the war.

The reports and addresses of the joint opening session held on Monday, Sept. 24, were reviewed in the issue of Sept. 27.

Co-ordination and Co-operation

R. A. Bull, Duquesne Steel Foundry Co., Coraopolis, Pa., presided at the Tuesday session of the American Foundrymen's Association. The first paper was read by H. R. Atwater, Osborn Mfg. Co., Cleveland, on "The Foundry from the Viewpoint of the Sales Engineer." Mr. Atwater said that his statements applied particularly to foundries having duplicate work, and he added that the introduction of molding machines, sand handling devices and conveying equipment for handling molds and carrying the hot metal had in the past five years virtually revolutionized the method of producing castings. Simply forcing up prices is not the way to increase wages permanently or pay the present high wages. Only by speeding up production can the wage demands of labor be met. It was his opinion that the success or failure of modern equipment and particularly of molding machines depended on the co-operation of the supervising executives in every department. Only by such co-operation can the necessary analysis of cost of production on given patterns, the proper rigging of the patterns and the flasks to be used, and the establishment of a proper price basis on a quantity production be obtained. It is not possible to secure a largely increased production unless the operator is to share in the increase.

The speaker cited foundries where the sole thought in the installation of modern equipment was the reduction in molding price that could be secured and where the belief existed that the cost of equipment should be returned to its owners in a few weeks or at most a few months. A foundry that suffers because the foreman or other executives do not know the possibilities of the equipment, the amount of production that should be obtained and the wages that should be paid is the foundry that does not get satisfactory production from its equipment.

The labor unit must be considered, he emphasized, because it usually follows that men will go where the most modern equipment is furnished and where they are required to perform the least amount of labor at the highest prices. The hope of the foundry in the future must be in installing power equipment and in teaching laborers to operate machines that will produce the largest possible output and net the operator more money than he can earn elsewhere.

F. J. McGrail, Struthers-Wells Co., Warren, Pa., in a paper on "The Relationship of the Engineering Department to the Pattern Shop and Foundry," made a strong plea for a better and a more enthusiastic co-operation and a larger degree of consultation among the executives of these departments. "There has not been the same advance in foundry practice that there has been in the demand made upon the foundry." Conferences would obviate many of the costly changes

which it is some times necessary to make on account of disproportionate metal sections and designs and the many incorrect methods of constructing and assembling patterns and core boxes. He pointed out that with many new and difficult problems continually coming up, a low labor cost in the pattern shop does not necessarily imply a low labor cost in the foundry.

In a lively discussion following the reading of this paper Stanley G. Flagg, Jr., Philadelphia, drew a distinction between the work of the foundryman which is an art and that of the engineer which is a science, and C. H. Gale, Pressed Steel Car Co., McKees Rocks, Pa., pointed out the obligation of the foundryman to show the engineer the practical side of the production of castings. John W. Langston, works manager G. & C. Hoskins, Ltd., Sydney, New South Wales, who came from Australia to attend the convention, told of the apprentice system in Australia and how it produced men who could be truly termed well-rounded engineers rather than specialists in a single branch, because their training is a blend of all the branches. President Pero spoke of the necessity of teaching apprentices the business of making castings, including a training in all those departments which influence the design and production of castings. He deprecated the policy of many concerns in pitting one department against another as regards departmental costs and expressed his belief that the lack of collaboration between the pattern shop and the foundry is common and productive of many troubles. Dr. Richard Moldenke, Watchung, N. J., said that the engineer is pushing the foundry and will push it still further. The foreign practice of placing engineers in charge of foundry operations has its advantages. Certain desirable changes in the physical properties of castings such as control of the hardness and limitation of expansion under the influence of heat are engineering problems that foundrymen will be compelled to solve in the immediate future.

Co-operative Shop Training

A paper on "Co-operative Shop Training," by W. B. Hunter, Fitchburg High School, Fitchburg, Mass., aroused keen interest. B. D. Fuller, Westinghouse Electric & Mfg. Co., Cleveland, spoke of the work which is just being undertaken in Cleveland and made a plea for a stronger interest on the part of employers in the public schools and a fuller and more intelligent use of the public school plants of the country.

Mr. Hunter said that ten years' trial of the co-operative trade training system in Fitchburg, Mass., has demonstrated its efficiency. Parents, the boys and their employers are all pleased with the results. The city may well say that it is a dividend paying proposition, for the pay these boys receive while at work is from four to five times the cost of instruction. Wages are 10 cents per hour for first period of 825 hr., 11 cents per hour for second period, 12 cents per hour for third period, 13 cents per hour for fourth period,

14 cents per hour for fifth period and 15 cents per hour for sixth period. That is, beginning the second year in the Fitchburg high school, the boy while working receives a raise after every period of 825 hr. His shop term is 30 weeks long and school term 20 weeks long per year. The shop rules and regulations apply in every particular, while the apprentice is at work, the same as the school rules apply while in school.

Our foundries, he added, have had difficulty in getting apprentices for some time. The Putnam Machine Co. advertised a one year's course for apprentices over

21 yr. in different branches of foundry practice, giving a rate of 30 cents per hour for the first six months and 35 cents an hour for the next six months. Applicants were carefully scrutinized by the superintendent and required to sign a bond with responsible surety for faithful service. Twenty-three accepted for the one year term. So many applicants continued to apply that a 2-yr. bond was executed and signed by many, and it is even possible to secure them for a 3-yr. term. It is very evident by this that we have got to offer more money than has been the case in the past.

Start Made on a Standard Cost System

A Feature of Activity Among Members of American Foundrymen's Association—Progress in Industrial Education

THE presentation of the committee on foundry costs, which had to go over to the Thursday morning session, was presented in outline by the chairman of the committee, Benjamin D. Fuller. He told how C. E. Knoeppel & Co., New York, had been engaged to install in foundries subscribing to the plan "a standard cost system." Estimating the possibility of 100 subscribers at the outset for a total of \$8,000 to \$10,000, it was decided to adopt the following schedule of charges:

Foundries employing up to 40 molders and coremakers, \$50.
Foundries employing from 40 to 200 molders and coremakers, \$1.25 for each molder and coremaker employed.
Foundries employing more than 200 molders and coremakers, \$250.

Mr. Fuller reported a total of 102 subscriptions amounting to \$7,246.25, and cash payments representing 25 per cent of total subscriptions, of \$1,950.68.

The plan of procedure, the printed report explains, provides for the preparation of a cost system that may be applied to steel, gray and malleable iron foundries

paid into this fund, the remaining 20 per cent to be retained by the association to defray the cost of conducting the campaign for enlisting the interest of members and to cover the cost of printing and publishing the standard cost system in pamphlet form. Twenty-five per cent of the cost of this work is to be paid to C. E. Knoeppel & Co. at the time of the adoption of the standard foundry cost system; 25 per cent after the personal visit has been made to each of the plants by the expert; 25 per cent after reports have been submitted to each one of the subscribers, and the final 25 per cent payment is to be made when the work with each individual plant has been completed. It was decided to divide each subscription into four payments. It is believed that before many months the fund will attain a total of \$10,000. As heavy traveling expenses will be incurred in introducing this system outside of the industrial centers, it was decided to make an extra charge, covering traveling and other expenses, to plants located west of the Mississippi River, south of the Ohio River and outside of the province of Ontario in Canada.

The report gives a list of subscribers to this fund on Sept. 1. Besides Chairman Fuller the members of the committee are: C. R. Messinger, Sivy Steel Casting Co., Milwaukee; H. J. Koch, Fort Pitt Steel Casting Co., McKeesport, Pa.; J. Roy Tanner, Pittsburgh Valve Foundry & Construction Co., Pittsburgh; C. H. Gale, Pressed Steel Car Co., McKees Rocks, Pa., and A. O. Backert, Secretary, Cleveland.

Following the presentation of the report, Mr. Knoeppel, in a brief address, said that in about two weeks he expected to meet with the committee. He emphasized the special problems which manufacturers will soon be called on to meet. He said they must plan to convert their plants to manufacture the products of special necessity; that they must arrange to replace many of their present employees with women and children, besides providing the special working conditions thus necessary; that they must look forward to arranging for two or perhaps three shifts and to provide for more efficient production, and that they must look forward to the probability of cooperating with manufacturers in their own territory, particularly on labor questions. In the intense commercial struggle which he expects after the war he asserted that manufacturers may look forward to the 8-hr. day and the possibility of stipulations against bonus or piecework methods. He accepted estimates that at present 90 per cent of manufacturers now fix their prices on an arbitrary basis, while the remaining 10 per cent use an accurate cost basis, while in Germany the conditions are just reversed.

Progress in Industrial Education

A progress report on industrial education was submitted by the association's committee on the subject, Frank M. Leavitt, University of Chicago, Chairman. C. E. Hoyt, Lewis Institute, Chicago, a member of the committee, has held conferences with a group of foundry foremen in Chicago, looking to the conduct of apprentice classes under the auspices of the public schools, but a satisfactory course of instruction has yet to be drawn up. The report expressed the hope that through the assistance of C. B. Connelley, Carnegie Institute, Pittsburgh, also a member of the committee,



BENJAMIN D. FULLER

President American Foundrymen's Association

and to plants making castings for the jobbing trade as well as solely for their own consumption. It is to be printed and distributed to subscribers in the form of serially numbered pamphlets. Then a representative of C. E. Knoeppel & Co. will visit the foundries of the subscribers to facilitate the introduction of this system and to outline methods whereby it may be worked into the cost system already in effect. Following the visit, each subscriber will receive a written report which will give in detail the methods whereby the standard foundry cost system can be adapted to the cost-keeping system in this plant. In addition, each subscriber will be permitted to continue to receive service from C. E. Knoeppel & Co. by correspondence for a period of one year.

The agreement provides for the payment to C. E. Knoeppel & Co. of 80 per cent of the total subscriptions

an experimental class may be organized in connection with the public schools of Pittsburgh. Stewart Schrimshaw, supervisor of apprentices for Wisconsin, has been added to the committee.

Arthur L. Williston, Wentworth Institute, Boston, Mass., discussed briefly the industrial education question at the general session on Friday from an angle somewhat different from that taken up by the association's own committee, which is working, as he ex-

pressed it, on details, and from that taken by the National Industrial Conference Board. He made the point that something is necessary to get everybody back of the movement to bring about public industrial education and a general resolution to this effect was passed by the association.

A paper on micrometallography for the foundry, by Robert J. Anderson, Cleveland Metal Products Company, Cleveland, was read by title.

Session on Gray Iron Casting Work

France Making Over 1,000,000 Cast-Iron Shells Daily—

Sand Blasting, Facing Sands and Briquetting Borings

THE gray iron session, scheduled for Thursday morning, was given over in part to general topics, including the standard cost system question, reviewed in the foregoing. A. W. Walker, past-president, presided.

Facing Sands

In a paper on fine facing sands C. P. Karr, associate physicist, Bureau of Standards, Washington, D. C., reported some tests on sands regarded as more or less suitable for facing molds. The investigation was undertaken to ascertain if there is available in this country a sand which may take the place of the imported French sand now growing scarce and costly. He enumerated the important requisites as being a high melting point, a fine texture, a low moisture content and a high tensile strength, or, in foundry parlance, a good bond.

In a paper on mixing and blending foundry facing sands, R. F. Harrington, Hunt-Spiller Mfg. Corporation, Boston, gives the results of a series of tests on methods for the purpose of reducing the consumption of new sand. Experiments were made on various mixtures blended by hand, in a paddle-type mixing machine, and in a muller. They indicated that the muller produces the best results and permits of the use of a maximum amount of old material, with a corresponding reduction in new sand consumed.

Using Briquetted Borings

In a paper entitled "Briquetting Foundry Borings," A. L. Stillman, General Briquetting Co., New York, described tests made with various mixtures of cast iron for miscellaneous castings and for locomotive cylinders. The results of the tests are taken to show that briquets have a very definite and promising future in foundry practice. He says that briquets in no way injure the product of the cupola and that their use effects economy. He predicts that the low price of borings in the briquetted form as compared with the cost of heavy iron scrap will encourage the use of briquets.

Dr. Richard Moldenke urged that the future of briquetting lies in the combination of foundries in a given center in the ownership or operation of a central briquetting plant. He mentioned a case in Europe where 25 foundries operated a central plant of this kind, this plant returning to each foundry the borings which it had sent for briquetting. He recounted the disadvantages and advantages of using briquetted borings and predicted that briquetting has got to come because in the future one pound of iron has got to go further than ever before. S. D. Sleeth, Westinghouse Air Brake Company, said that his company had given up the process partly because of the present high cost of borings, but told also of the hard castings which sometimes resulted and of the melting loss experienced. Dr. Moldenke pointed out how some of these difficulties are met and told how he had advised against the earlier practice of making briquets 7 in. in diameter.

Shells of Cast Iron

A paper on "Cast-Iron Shells in Permanent Molds" was presented by Edgar A. Custer, consulting engineer, Philadelphia, now a major in the ordnance division of the U. S. Army. He introduced his subject by pointing out superior effectiveness of the cast-iron shell in attacking earthworks. He maintained also that the efficiency of a shell fired against troops is dependent

almost entirely upon the character of its fragmentation, in which particular cast-iron shells have been shown to be much more satisfactory than forged-steel projectiles. Cast-iron shells, with proper foundry procedure, can be easily made in enormous quantities, he claimed. France, he said, is making over 1,000,000 rounds a day at present in dry-sand molds. The cost of steel forging for a 4.7-in. shell he put at over \$7, and a cast-iron shell of similar size at a little over \$2.

To achieve uniform and satisfactory quality the permanent mold, in the development of which the author has taken a leading part, is recommended. The details of making shells in permanent molds he discussed, and the methods by which difficulties may be overcome. A résumé of the French specifications for cast-iron shells is given.

In the discussion material for hand grenades was touched on, and Mr. Fuller referred to some experiments in a bomb proof. When grenades of cast iron



W. M. CORSE

President American Institute of Metals

were exploded nothing resulted in the way of destruction, and there was scarcely anything save a powder of cast iron. With malleable iron large fragments resulted, and some of them went through the 1-in. pine box like bullets.

A paper on the seasoning of gray iron castings by L. M. Sherwin, Brown & Sharpe Mfg. Co., Providence, R. I.; one entitled "Factors in the Economical Production of Small Cores in Large Quantities," by Prof. R. E. Kennedy, University of Illinois, and one on the effect of high sulphur in gray iron castings by T. Mauland, International Harvester Co., Chicago, were read by title. A paper on the modern centrifugal cupola blower was presented by a representative of the General Electric Co.

Sand Blasting

An address on sand blasting was made by H. L. Wadsworth, American Foundry Equipment Co., Cleveland. The labor scarcity of recent years and stringent

health laws, he said, had now caused as much consideration to be given to sand blast equipment as has been given to cupolas and cranes. While the art was discovered by America it has been developed by Germany, but he felt that the Germans had gone too much into automatic apparatus, and that the American apparatus is simpler. In planning a new foundry he emphasized the importance of calling in an expert in sand blasting and emphasized that it is best to put money in good equipment at the outset. He outlined the various classes of apparatus and admitted that the most efficient method of cleaning castings, especially of cored work, is the hand method, though in some cases ordinary tumbling is cheaper. Hand sand-blast method is efficient except in the case of the lightest castings, because the scale may be hard in parts and intensive cleaning of such parts is needed. He spoke of the popularity of the rotary tables, especially in automobile plants, including the type in which the worker remains outside of the sanding chamber, viewing the work through a copper mesh screen.

He felt that the foundry is coming to use fine hard white sand, but that careful study is still needed in this one matter. He urged the selection of air compressors fully large enough for the work, particularly because of the increasing uses for compressed air. He felt also that a standard well-known machine should be considered, both in the matter of making repairs and of getting a good market value when necessary to sell, as for replacement. He preferred a two-stage compressor to a single stage. He called attention to the common mistake of rating compressors on the basis of displacement, as compressors of the same displacement may have efficiencies ranging from 50 to 80 per cent.

Mr. Fuller told of some experiences with sand blasting apparatus, which he regarded as a good thing to install even if nothing more than a home-made equipment could be paid for. A new sand blasting plant has been installed in the Cleveland works of the Westinghouse Electric & Mfg. Co., and in proportioning it it was decided to go beyond the generally specified air movement of five times the volume of the room per hour by arranging for ten times. The air is admitted at the top of the room and carried away at the feet of the operator. With a movement corresponding to ten times difficulties developed in keeping the air pipes in

repair, as the joints of the exhaust pipes cut out in two to three weeks. Applied to the cleaning mills the jacks or stars with this heavy air movement were carried to an upper story. The air movement rate was reduced to about seven to seven and one-half times.

Oxy-acetylene welding and cutting was the subject of a paper by Stuart Plumley, Davis-Bournonville Co., Boston. It dealt in part with welds made on the machinery of damaged German vessels interned on the Atlantic coast. It is planned to review the paper in a later issue.

A paper on foundry transportation and conveying problems was presented by Robert E. Newcomb, Deane Works, Worthington Pump & Machinery Corporation, Holyoke, Mass.; one on grinding wheels by Wallace T. Montague, Norton Co., Worcester, Mass., and one on refractory materials by H. C. Arnold, University of Illinois.

War Resolutions

In connection with the war, an important step was taken by the association in passing a resolution at the Thursday session, as noted elsewhere. This resolution provided for the appointment of a War Service Board to consist of five able men prominent in the non-ferrous as well as ferrous casting industry to work with the Government, if its help is desired, in securing desired production of proper quality castings at "fair" prices. The resolution carried with it the authority to appropriate money from the association treasury and Past-President Bull intimated that fully \$10,000 could be made available at this time.

The association also passed a resolution that as representing the steel, gray and malleable iron industries of the United States, it "will do all within our power to mobilize our plants and their output, placing them at the disposal of the Government and will speed-up production to the end that the needs of our Government will be more promptly met and in every other way we promise our aid and support to our country to hasten the defeat of our enemies."

A resolution on the Liberty Loan was also passed, pledging the members to "devote the same efforts to the sale of the second and succeeding issues as they so patriotically devoted to the first bond issue," and those of them employing members to "render every possible assistance to their employees in the purchase of bonds."

Two Sessions Devoted to Steel Foundry Problems

Steel Castings for Gun Carriages—Important Points Relating to Electric Furnaces—Vanadium and Small Open-Hearth Furnaces

OF the two sessions, Thursday and Friday mornings, devoted to steel foundry problems, the Friday meeting was the more prominent. Special emphasis had been laid on the paper by Major C. M. Wesson of the Watertown Arsenal, Watertown, Mass., entitled "Steel Castings for Ordnance Construction." This paper had been scheduled for the Thursday morning steel session, but was transferred to the Friday meeting to accommodate Major Wesson. In order that a large number of foundrymen could hear the paper, the steel and gray iron sessions were temporarily consolidated.

Steel Castings for Gun Carriages

That Major Wesson had devoted a great deal of time and thought to his paper is evidenced by the thoroughness with which he treated this important subject in his 35-page paper. THE IRON AGE will later print an abstract. The Major supplemented its presentation with numerous slides showing the intricacy and importance of castings needed in modern high-power gun carriages. Starting with the statement that it had been found impossible to obtain an adequate supply of these castings from commercial foundries, due to their inability to meet the specifications or to produce sound castings, or other reasons, the Government established a foundry of its own at the Watertown Arsenal early in the 90's. The first melting unit was a converter which has been in operation continuously. Since then a 15-ton tilting acid open-hearth

furnace has been installed and successfully operated. The speaker announced that he hoped electric furnaces would soon be running.

Major Wesson called particular attention to the unusual shock to which ordnance castings are subjected and the consequent necessity for metal possessing sterling dynamic properties. His paper incorporates a discussion of the various specifications for the three grades of Army ordnance castings and for other material such as forgings, etc. Attention is called to the fact that chemically the specifications for castings are less stringent than the railroad or those of the American Society for Testing Materials. As a whole they are regarded by the author as reasonable, but requiring high-grade foundry practice and strict attention to details, scientific and otherwise. The paper gives an extensive table of static results obtained at the arsenal from both converter and open-hearth metal.

A large part of Major Wesson's contribution is devoted to details of the molding, melting and annealing practice of the Government plant at Watertown. Photomicrographs of good and bad metal are given. The importance of shock or dynamic tests of all metal produced was also dwelt upon by the author, who showed the extent to which his plant went into this subject, using the Charpy shock test instrument.

Discussion on Ordnance Castings

The discussion of Major Wesson's paper was worth much more time than could be devoted to it. F. Hodg-

son, Electric Furnace Construction Co., Philadelphia, congratulated the author on his delineation of the value of the use of more scientific methods in steel foundry practice. In England he said steel castings were being used extensively in place of forgings, but in the famous war tanks it had been found impossible to obtain castings that would stand the severe strains. The speaker expressed his satisfaction in Major Wesson's statement that there was a prospect of introducing the electric furnace as a medium for making important castings. He believed that there would result less trouble from slag inclusions and especially cold metal by the use of the electric process.

As to specifications, Mr. Hodgson stated that those given by Major Wesson compare favorably with the British. For the tanks, castings had been obtained having a tensile strength of 90,000 lb. per sq. in. with an elongation of 20 per cent in 2 in. and a reduction area of 25 per cent. The speaker was of the opinion that the importance of heat treatment had been exaggerated; that it was more important to make better steel. He called attention to the shortage of steel castings in both England and France and believed there

pared with the lower grades, Major Wesson said that for air cooling or quenching such a temperature was found better.

R. A. Bull, Duquesne Steel Foundry, Coraopolis, Pa., and former president of the Foundrymen's Association, closed the discussion by emphasizing the great service bestowed on the convention and the subject of steel castings in general by Major Wesson's paper. The details furnished he regarded as especially illuminating and valuable. The committee on papers was desirous of bringing to the front the attitude of the association toward the Government, the war and the supply of castings, and this had been an object in securing this important paper. The treatment of the subject from the viewpoint of ordnance experts was nearly epoch-making. Mr. Bull wished it understood that the attitude of steel foundrymen has been and is that we are all now on a different basis, but all after the same object and ready to do anything to win the war.

The Electric Furnace in the Foundry

The remainder of the Friday morning session, before and after the presentation of Major Wesson's

WAR SERVICE BOARD

Established by American Foundrymen's Association

At the session of its annual meeting at Boston held Sept. 27, a resolution was passed by the American Foundrymen's Association, as follows:

BE IT RESOLVED, That the American Foundrymen's Association does hereby authorize and direct its president to appoint a War Service Board to consist of five of the ablest men engaged in the manufacture of gray iron, malleable iron, steel and non-ferrous castings in the United States irrespective of their membership in any organization, who shall serve without compensation and shall give such assistance (as a board operating directly, or as a central board governing subsidiary boards or committees) to the Government of the United States as may be possible, with the approval of the said Government, in the securing of castings of proper quality, at desired rates of production, at fair prices, to meet the needs of said Government; and in the conducting of any investigations into the manufacture of castings considered advisable in the furtherance of objects mentioned herein; and

BE IT FURTHER RESOLVED, That the proper officers of the American Foundrymen's Association are hereby authorized, if considered advisable by the said War Service Board which shall be appointed with the approval of the United States Government, to disburse such sums as may be necessary to defray the proper expenses for conducting the work of the co-operation with the United States Government referred to in the foregoing; and

BE IT FURTHER RESOLVED, That the directors of the American Foundrymen's Association be and they are hereby authorized to take such steps as they may consider advisable to appropriate or secure whatever funds may be needed for the most effective co-operation proposed in these resolutions.

was an opportunity for American foundrymen to make up this deficiency.

Discussing the question of acid or basic castings by the electric process, Mr. Hodgson claimed that good steel for aeroplanes was being made by the basic in England. Commenting in reply on this subject, Major Wesson said that investigations of basic steel for gun forgings were bringing out encouraging results, as was also steel made by duplexing from the open-hearth into the electric where the refining was basic.

Anketell M. Henderson, manager Commonwealth Steel Products Co., Ltd., Sydney, Australia, stated that ordnance specifications in that country were not so severe as those mentioned by Major Wesson, and that it was possible to meet them with the steel made there in 2-ton converters. He, however, regarded the heat treatment as all important. At the Woolwich Arsenal in England it is the practice to hold the ladle from the converter 10 to 15 min. before pouring castings, insuring a metal freer from slag and other inclusions.

In explanation of a point raised by Mr. Wilson of the Connecticut Electric Steel Co., New Britain, Conn., as to why a higher temperature for annealing was stipulated for No. 3 grade of ordnance castings as com-

pared with the lower grades, Major Wesson said that for air cooling or quenching such a temperature was found better. The session was opened with W. H. Janssen in the chair by the offering by the author of an abstract of the paper "Comparison of the Electric Furnace and Steel Converter for the Manufacturer of Small Steel Castings" by C. R. Messinger, Sivy Steel Casting Co., Milwaukee, Wis. The paper presents results of the operation of two 1-ton Snyder bottom electrode, single-phase electric furnaces installed, one in the plant of the Sivy Steel Casting Co., Milwaukee, and the other in that of the Electric Steel Co., Chicago. Generally speaking, these furnaces have been operated with acid linings, although enough experiments were made with basic linings to reach the conclusion that this type of furnace is not adapted to basic operation, said the author. The results with acid linings have been entirely satisfactory and the costs favorable. An average of 368 heats per lining has been obtained, with a refractory cost of 7.8c. per ton of steel. The electrode cost is 70c. per ton. The power consumption has averaged 635 kw.-hr. per ton. The total costs show a slight margin in favor of the electric furnace, compared with the converter. In the East, where the freight on low-phosphorus pig iron is lower, the margin is in favor of the converter.

In the discussion of this paper W. R. Bean, Eastern Malleable Iron Co., Naugatuck, Conn., asked what were the principal factors in 24-hr. operation of such furnaces. Mr. Messinger's reply was to the effect that the company secured the advantage of a better rate for power and a better refractory cost.

Bottom Electrodes and Single-Phase Current

A. M. Henderson, Sydney, Australia, asked three questions: Accidents from the use of a water-cooled bottom electrode, the absorption of silicon from the acid lining and the occurrence of electrical surges from the use of single-phase current. In England, he said, there has been considerable trouble from this. Mr. Messinger, in replying, stated that as to accidents from the bottom electrode—they had experienced two serious ones, one resulting in sending one man to the hospital and the other in sending three to the same place, to say nothing about loss of metal, etc. As to silicon absorption, trouble had been experienced at first, but its regulation was a matter of practice, for uniform silicon content is possible. The question of surges, the speaker said, he knew little about. It is, however, a fact that power companies do not favor single-phase furnaces, for the load is such a small part of the total. The company furnishing power to his plant in Milwaukee has five single-phase small furnaces on its line, but it would not look with favor on a large unit.

"Recent Developments in the Application of the Electric Furnace to the Melting Problem" has been the subject of a paper by Douglas Walker, Booth-Hall Co., Chicago. It was presented in abstract by Carl H. Booth, president of the company. The paper was quite general in its nature, commenting on the change that has taken place in the last year or so in the attitude of foundrymen toward the electric furnace as a melting medium, on the various applications of the electric furnace to the foundry, on the use of electric melting units in England for producing high-grade gray iron castings, on the problem of electrically melting ferroalloys and the production of malleable iron. Basic instead of acid linings were recommended partly because of the high price of low sulphur and low phosphorus scrap. The characteristics of an ideal furnace were outlined, together with the power question and the reasons for the superiority of electric steel. The paper was not discussed.

The paper by John A. Crowley of the John A. Crowley Co., Detroit, Mich., on "Notes on an Electric Furnace Design" was presented in abstract by A. M. Minnick of the company's Detroit office. The author describes the design and construction of a 1-ton Grönwall-Dixon furnace. In choosing between a rugged, simple design and one that is more finished and complicated, the author believed good practice would recommend the former, which will require little or no attention. Also, should such a furnace break down, replacements can be made in much less time than on one of a more complicated design. The furnace described in the paper is provided with automatic electrode controls and with a specially designed tilting device, the mechanism of which is enclosed. Figures on the cost of operation were presented.

Current Flow in the Bottom Electrode

P. A. E. Armstrong, vice-president Ludlum Steel Co., Watervliet, N. Y., raised the question as to the amount of current flow through the neutral bottom electrode because in his experience he claimed there was no flow until the bath was hot, magnesite being a non-conductor. He thought, however, that bottom connections were ideal. Mr. Minnick stated in reply that he believed about 2000 amperes passed through this electrode in a 5-ton furnace of this type, but he was not sure. In reply to a question as to whether the conducting hearth was always in operation, the speaker said it was continually used in refining.

"The Electric Furnace from the Central Station Standpoint," by E. L. Crosby, Detroit Edison Co., was presented by C. F. Hirshfeld, manager of the research department of that company. An abstract is as follows:

Considerable difficulty is involved in presenting a paper under this title in a manner interesting to foundrymen. It is, of course, apparent that from a technical standpoint, the

features of an electric furnace which would be found of greatest interest to the central station man or to a foundryman would be widely different. It would be vastly easier to present to a group of central station people a paper on the electrical characteristics of the electric furnace or to discuss before a society such as the American Foundrymen's Association, the general characteristics of the electric furnace with particular reference to its metallurgical features. In your consideration of the paper as presented the writer sincerely hopes you will bear in mind that the ideas he has attempted to bring out are those which it seems to him can best be developed and improved upon by co-operation between the foundry and the central station.

The author believes that the central station anticipating electric furnace business should be prepared to discuss the electrical and metallurgical characteristics of the various types of furnaces with the buyer in an intelligent manner. The writer also believes there is considerable opportunity for the standardization of the methods for obtaining power demands by central stations throughout the country. Regulation, phase balance and wave distortion are equally as important considerations to both the consumer and producer of electricity for electric furnaces as power factor, which up to date has received the most study.

The paper concludes with a discussion of the economics of the electric furnace from the standpoints of both the steel foundryman and the central station, it being pointed out that under existing conditions the foundryman may get back his initial investment in a few months, whereas the producer of the electrical energy must look to the long future.

Little time was left for discussion on this paper, as it was presented after the joint meeting which heard Major Wesson's paper. F. T. Snyder, inventor of the Snyder furnace, argued for single-phase current and its advantages.

The other steel session, held Thursday morning, was devoted to miscellaneous subjects connected with steel foundry problems. It was presided over by A. H. Jameson, Malleable Iron Fittings Co., Branford, Conn.

Vanadium in Steel Castings

The first paper called for was "The Use of Vanadium in Steel Castings," by J. Lloyd Uhler, metallurgist Union Steel Castings Co., Pittsburgh, who read an abstract. The author shows that vanadium has been used by steel makers extensively only in the last few years; that it acts in the steel on both the oxygen and nitrogen at high temperatures, combining with them, eliminating them or neutralizing their harmful effects, and that it acts so as to knit the crystals more closely together, causing the pearlite and ferrite to appear in smaller aggregations and making a denser steel. Some interesting results are presented of tests on vanadium steel castings made to take the place of forgings in marine turbines.

The chairman called on Edwin F. Cone, associate editor THE IRON AGE, to open the discussion. Mr. Cone stated that his own experience in making many heats some years ago of vanadium steel castings, particularly locomotive frames, corroborated the testimony of Mr. Uhler in his paper. Vanadium, added to plain mild carbon steel, does cause a denser metal and one containing finer crystals, particularly in the green or unannealed condition. He asked the author what heat treatment was used generally on such castings in his plant. Mr. Uhler replied that it was simple annealing, that is, soaking at the recalescent point followed by slow cooling in the closed annealer.

In reply to a question regarding the feasibility of ladle additions of the ferrovanadium, Mr. Uhler stated that it was their practice to add the ferrovanadium always to the bath of the open-hearth furnace, the metal referred to in the paper being acid open-hearth steel, made in 25-ton heats. He never favored adding the alloy to the ladle. The loss, he said, was not large when added to the bath, it being his experience that by adding 0.22 per cent vanadium it was possible to finish the steel at 0.19 per cent vanadium.

Use of Vanadium Steel Scrap

Mr. Uhler also stated that it was the company's practice to segregate all vanadium steel scrap in the foundry and recharge it as scrap in regular heats, that by so doing it was possible to recover from 0.03 to 0.06 per cent of the original vanadium. Mr. Cone testified that he had intended to ask Mr. Uhler regarding this

point because he had found in his previous experience referred to that by so collecting and using such scrap it was possible to recover at least as much as Mr. Uhler had stated, thus offsetting in part some of the loss necessarily accompanying additions of the alloy to the bath.

Asked by Mr. Cone whether the ferromanganese additions were also made in the bath, a practice recognized by many as the best, Mr. Uhler stated that while he believed in adding this alloy also to the bath, owing to its scarcity and high price he had been obliged to put 50 per cent of it in the ladle. To do this he had caused it to be broken into small pieces, had placed it in a hopper directly over the spout, where it became preheated to a considerable extent before use. It was then allowed to fall into the spout as the metal flowed from the furnace.

Mr. Cone stated that he had found that the incorporation of about 0.18 to 0.20 per cent vanadium in ordinary mild carbon steel castings raised the elastic ratio from 60 per cent to 70 per cent after simple annealing and asked Mr. Uhler if that was also his experience. The author replied that such was the case.

Small Open-Hearth Furnaces

In the absence of the author, the chair asked Mr. Cone to present the paper "A Description of a Small Open-Hearth Furnace," by David McLain, McLain's System, Milwaukee, Wis., which he did in abstract, calling attention to the importance of such small units and suggesting a discussion as to the percentage of loss, the quality of the metal and its uniformity. An abstract of the paper is as follows:

The author recounts some exceedingly interesting experiences in the early days of the steel foundry business. The operations of William Hainsworth of Pittsburgh, who established the first Bessemer steel foundry in this country, are described in some detail. Throughout his life, Mr. Hainsworth was confident a successful small open-hearth furnace could be built, and he spent thousands of dollars experimenting with apparatus of this character. He never, however, succeeded in realizing his ambition.

The McLain-Carter small open-hearth furnace, which this paper describes in detail, is built in sizes ranging from one to five tons. Oil fuel is used. The oil consumption is stated to be 65 to 70 gal. per ton of steel. The roof, it is claimed, will stand for 500 to 700 heats, with the furnace turning out high-temperature, fluid metal.

Mr. McLain, who was present after his paper had been presented, said, in response to questions, that for small light sections no larger than a 2-ton heat was

advisable, but that his furnaces will melt up to 5 tons. As many as four 4-ton heats can be made in 12 hr. He placed the melting loss at 8 to 10 per cent and claimed that as good metal could be made as in any large open-hearth or other process. He added that on Sept. 10 there were 7 such small furnaces operating in the United States.

Mr. Henderson stated that in his converter foundry in Australia it was the practice to run the manganese content of the steel to 0.85 to 0.90 per cent for ordinary work, with the manganese at 1.00 per cent to 1.10 per cent for small sections. They had no trouble in securing an elongation of 34 per cent in 2 in. and a reduction of area of 45 to 60 per cent. The sulphur ran about 0.04 per cent, with the phosphorus at 0.06 per cent. This was offered as a comparison to Mr. McLain's statement that in his furnace the metal averaged about 0.24 per cent carbon, 0.66 per cent manganese, with the silicon at 0.28 and the sulphur and phosphorus around 0.035 to 0.045 per cent.

New Way to Burn Oil

"A New System of Burning Crude Oil" was the subject of a paper by W. A. Janssen, production manager Canadian Steel Foundries, Montreal, which he presented in abstract. The author stated that in the new system the air is preheated and subsequently mixed with oil in definite proportions, creating a combustible gas which is forced into the furnace under positive pressure, resulting in perfect combustion. The preheater is cast iron and is provided with flues for the passage of waste gases which form the source of heat. The vaporizer is a hollow cast-iron fitting having baffles to insure an intimate mixture of oil and air, and thorough vaporization in the furnace. For perfect combustion 25 cu. ft. of free air per min. per gal. of oil burned per hr. are required, resulting in oil economies of 40 per cent.

In the discussion A. M. Henderson stated that he had seen it in operation, and that the flame was not a cutting one; that it was suited to many metallurgical operations. He asked whether it had been used for burning coal tar, to which Mr. Janssen replied that it had successfully, with no carbon deposition.

Standard Sleeves and Stoppers

The report of the A. F. A. committee on steel foundry standards embraced recommendations as to the proper size of sleeves and stoppers. It was presented by Chairman Janssen and was adopted without dissent by the meeting.

Important Meeting of Malleable Iron Producers

Application of Powdered Coal to Melting Furnaces and Difficulties of Machining Some Malleable Iron Discussed

NO more important or successful session on malleable iron has ever been held by the association than the one this year. This was generally conceded by all and was emphasized by President Pero, who was the chairman of the meeting on Wednesday morning devoted to this subject. He expressed his appreciation of the interest shown and stated that it has been potentially manifest only in the last two years. Several years ago such meetings would have been impossible; free interchange of ideas was then regarded as the revealing of trade secrets.

Powdered Coal for Malleable Furnaces

Pulverized coal in malleable practice was a topic on which two papers of importance were presented. They were freely discussed. The "Application of Pulverized Coal to the Air Furnace," by W. R. Bean, Eastern Malleable Iron Co., Naugatuck, Conn., and the "Application of Pulverized Coal to Malleable Melting Furnaces," by Joseph Harrington, advisory engineer, Chicago, were both presented in abstract by Mr. Bean.

Mr. Bean in his paper called attention to the lack of uniformity of metal due to hand firing and the need of mechanical firing. Mechanical stokers in his opinion have not solved this problem, but the use of pulverized coal gave promise of success. Results of tests covering

36 heats in an air furnace fired with pulverized coal were given. One point emphasized was that the coal may to advantage be different from that used for hand firing in that the coal in which the fusing point of the ash is low has certain advantages over coal in which the ash has a high fusing point. Ash with a low fusing point will deposit earlier as slag. Pulverized coal furnaces offer an opportunity for the employment of waste-heat boilers, together with the possibility of using silica brick in furnace linings. The principal advantages derivable are: Less exhaustive labor, the clinker problem solved, lower fuel cost, smoke elimination, more efficient use of waste-heat boilers and a reduction in cost of furnace maintenance.

Mr. Harrington in his paper pointed out the ease with which a charge can be melted rapidly when using powdered coal and that flame temperatures exceeding 3000 deg. are possible. The deterioration of refractories was no greater than in ordinary firing. The powdered coal jet does not impinge directly on any brick work and its controllability is a feature. When using powdered coal, there is an actual diminution in the burning out of carbon of some 2 to 5 per cent, making it possible to reduce the amount of new pig in the charge.

In the discussion of Mr. Bean's paper, Stanley G.

Flagg, 3rd, Stanley G. Flagg & Co., Philadelphia, mentioned the desire of many to get away from gas coal, due to present conditions, and asked if oil was not less difficult to apply as well as cheaper than powdered coal. Mr. Bean pointed to the experience of open-hearth men as the reply. One such user of powdered coal had said that he would not change back to oil with oil at 2c. per gal. He had not found it as satisfactory as hand firing because of more oxidation and insufficiently high temperatures. There are complications, he knew, but at least 11 malleable foundries are now using powdered coal for one purpose or another.

Prof. Enrique Touceda said he did not understand how one can use silica brick in a process that is not continuous due to spalling of the brick, thus increasing the cost of maintenance. He knew of one company making wrought iron which changed from coal firing to powdered coal, with the result that the brick did not stand up. He believed in powdered coal for making cement, but the production of malleable iron is not a continuous process. Mr. Bean replied that a furnace would be maintained at a temperature so as to protect the brick between heats; that the amount of fuel necessary for this was not great. As to cost of maintenance—in 11 consecutive heats using powdered coal no repairs were necessary; there was but little damage to side walls, the greatest being at the bridge wall.

Fuel and Uniformity of Product

Mr. Pero called attention to the timeliness of the paper from a labor standpoint in the desire to get away from hand firing, for in St. Louis in hot weather this was a serious consideration. An argument not brought out against hand firing was uniformity of product. From his own experience he could state positively that he was getting better control of chemical content by the use of oil than from forced draft hand firing and better and quicker heats. His company is about to equip three more furnaces with oil. While there is no economy of oil over coal, there are the factors of decreased cost of labor and less furnace repairs—the great point, however, he claimed was uniformity of product. "I am bitterly opposed to hand firing. I am not familiar with the use of powdered coal, but with oil I know exactly when to expect a heat finished."

"Those who have used both oil and powdered coal," said Mr. Bean in answering Mr. Pero, "prefer the latter. They can point the flame wherever they desire." The sulphur content does sometimes cause trouble, but other elements can be so regulated as to offset it easily and satisfactorily, he said. Good malleable iron is made to-day high in sulphur. The cost, however, is in favor of the coal. In his experience with powdered coal he had found the combustion more nearly perfect.

Mr. Pero closed the discussion with the statement that only recently had oil been adapted to malleable furnaces, that at first he did not know how to burn it, but had found that no bridge wall was an advantage with the use of little pressure but a good volume of air.

The discussion of the second paper on powdered coal, that of Mr. Harrington, was introduced by Mr. Flagg, who desired to know what disposition was made of the fine ash and whether it did not spread itself over the neighborhood. Chicago has watched this carefully, Mr. Bean replied, and had reported favorably. Powdered coal had been adopted to get away from the smoke nuisance. Usually most of the dust fuses and more skimming is necessary with about 1600 lb. of ash removed from a 20-ton heat. Mr. Bean favored a preliminary combustion chamber. At the plant of the American Iron & Steel Mfg. Co. (now part of the Bethlehem Steel Corporation), Lebanon, Pa., where over 100 furnaces fired with powdered coal are in use, ash is reported as no detriment.

Mr. Bean reported on temperatures that he had taken with a Fery pyrometer. At the bridge wall he had found the range to be 2800 to 2950 deg. Through the side wall the same temperatures were discovered by the use of a thermocouple. At the stack base the temperature was 2500 deg.

Malleable Iron Difficult to Machine

The matter of certain difficulties in machining malleable iron was introduced by A. T. Jeffrey, Dayton

Malleable Iron Co., Dayton, Ohio, who presented in abstract his paper, "Troubles Encountered in Machining Malleable Iron: Causes and Remedies." There are five distinct varieties of iron from which one or more of these complaints may arise. They include pure, hard, white iron; under-annealed iron; iron cooled too quickly; burned iron and iron that is sometimes called hard but is really tough and stringy.

In summarizing, said the author, it may be stated that the fundamental or underlying cause of trouble with malleable iron in the machine shop is generally due to a lack of scientific study of the material in question along practical lines and to the lack of active co-operation by the users of malleable iron. Designing engineers have neglected to familiarize themselves with the properties and peculiarities of malleable iron, due largely to the meager amount of authoritative information in print, and their unwillingness to accept the statements of men who are well informed but are perhaps unable to express themselves fluently and who are the operative heads of our best malleable foundries. In many instances bad designs are changed with reluctance, although the engineer is becoming more alive every day to the advantage and necessity of close co-operation with the practical man in the foundry. As in other spheres, therefore, co-operation should be our watchword, and with intelligent effort and hearty co-operation between producer and user, most of our troubles will disappear.

C. H. Gale, Pressed Steel Car Co., Pittsburgh, confessed that he had had considerable experience regarding complaints as to hard metal; that nine-tenths of his product was strong and tough, with the rest less strong and easily machinable. Customers had complained that the metal was too hard to machine and had offered as an example a curl of iron 12 in. long. In each case it was by no means hard but soft and tough and the company had refused to accept it as defective.

Mr. Flagg was certain that often complaints as to non-machinability due to hardness were often traceable to the use of the wrong tool. The metal was tough and not hard. In some cases it was possible to bend such a casting nearly double, proving its ductility and softness as well as its toughness.

Carbon Losses in Annealing Malleable Iron

The subject of carbon losses in malleable iron annealing was brought up by the paper by Joseph B. Deisher, T. H. Symington Co., Rochester, N. Y., entitled, "Comparative Carbon Losses in Malleable Iron Annealing by Muffle and Pot Oven Methods." The paper dealt with many of the factors entering into the annealing of malleable castings in muffle and pot ovens. According to the author, the safe annealing temperatures are from 1450 to 1650 deg. Fahr. for pot ovens and from 1500 to 1700 deg. for muffle ovens. Mr. Deisher believes that the 60 hr. usually considered necessary to completely dissolve the iron carbide are not actually required and that the best practice is to bring the castings to the highest temperature at the beginning of the anneal, such temperature to be held until the iron carbide is dissolved, and then drop to 1400 deg., which is considered favorable for the precipitation of the graphitic carbon. In a comprehensive discussion of the advantages and disadvantages of the pot and muffle ovens, the author concludes that the conversion rather than the removal of carbon in the anneal produces ductility. This contention seems to be borne out by the results of tests made with castings which were annealed in mild packing, strong packing and without packing.

Mr. Deisher in further explanation said that one great objection to malleable castings was the inability to get them in a hurry. The question of getting castings in less time was important, and it had been asked whether the rate of cooling could not be controlled to accomplish this. The point is not the control of the cooling but the quickening of the time of dissociation of the iron carbide. The control of temperature is important, so as to cut down the time of this dissociation.

Mr. Gale, in reply to a suggestion as to the scale often found on annealed malleable castings, said that this was often as low as 0.09 per cent in combined carbon with practically no graphitic carbon present.

As to the temperature ranges for annealing, it was asked whether it was better to keep near the maximum or the minimum as outlined in the paper. Mr. Deisher replied that the maximum should be maintained for

about 30 hr. when there is the most dissolution, but at the end this should not be maintained; it should gradually diminish to 1600 deg. at about the middle of the annealing period or until the carbide is dissolved.

How Malleable Iron Has Improved

The extent to which malleable iron has improved was well illustrated by a paper by Enrique Touceda, consulting engineer, Albany, N. Y. He presented an abstract of his paper, "How Malleable Iron Has Improved," which is printed in part in this issue. The author emphasized his contention that one of the most serious shortcomings of malleable iron in the past has been its lack of uniformity. "I consider the improvement accomplished in this direction in the last few years to have much more far-reaching effect with the user of the metal and to be of greater importance to him than the ability of the founder to obtain high strength

and ductility." He expressed his appreciation of Mr. Pero's narration of his experience as to uniformity from the use of oil as a fuel.

In reply to a question, Prof. Touceda said that the tests in Table 5 had to do with iron containing 0.10 per cent sulphur. Replying to a question by Mr. Flagg as to whether the unusual elongations of Table 5 were from iron melted in the open hearth, Mr. Touceda said that they were all air furnace iron and regular test bars from a fine run.

Two papers on the application of waste-heat boilers to the malleable melting furnace were not presented in the absence of the authors. One was "The Theory of the Modern Waste-Heat Boiler and Possible Application of Such Boilers to the Malleable Melting Furnace," by A. D. Pratt, Babcock & Wilcox Co., New York, and the other was "Application of Waste-Heat Boilers to the Malleable Melting Furnace," by C. D. Townsend, Danville Malleable Iron Co., Danville, Ill.

Session on General Foundry Questions

Relation Between Employer and Employee and Development of a Safety Code Considered—Officers Elected

THE session of Wednesday morning opened with the reading of a paper by J. F. Kent, American Cast Iron Pipe Co., Birmingham, Ala., entitled "Improving the Relationship Between Employer and Employee." The author outlined the methods by which cleanliness is encouraged, medical treatment is administered, physical examinations conducted, Y. M. C. A. work organized, and thrift and education promoted. Statistics are given to show the results of this work.

R. A. Bull in the discussion suggested that foundries had made a great mistake in the past by not providing conveniences for their men. Where welfare was being done there could be no greater error than always to be reminding the men of the work done for their benefit. This is a fatal mistake because such things must and should speak for themselves.

William Judson Kibbe, employment specialist, Cleveland, who was to have been heard Tuesday, followed with an enlightening talk on "How Character Analysis Solves the Man Problem." Departing widely from the paper which had been printed in advance, his address, couched in some of the virile language of the day, pointed out that the most efficient plants are those where the men are happy and on the right jobs. The first great need is to teach executives how to understand the other fellow. "The biggest job in your plant of to-morrow awaits the man who is to select your employees," he continued. In a strong plea that his auditors get the new viewpoint in employment work, the speaker expressed the conviction that no machine is better than the man behind it. "In the matter of cost pertaining to machinery, merchandise, labor, etc.," he continued, "we demand perfect knowledge; in other words, we are very scientific in the running of our business, for we find that we cannot succeed unless we operate our business upon a scientific basis, that is, organizing our knowledge pertaining to our business. In the face of this truth, why should we go on blindly employing men with no regard to their fitness or efficiency? The time has now arrived when industry demands to know more about this problem and it has set its face toward it with a grim determination to master it at all cost."

Safety Code Question

The next number on the program, which was the report of the A. F. A. committee on safety, sanitation and fire prevention, provoked a discussion which at times waxed warm. This was due to the safety code reported by the committee. The point at issue was that there should not be two safety codes before the legislatures of the country, one backed by the American Foundrymen's Association and the other by the National Founders' Association. It developed that efforts to get the committees of the two organizations together had been futile. The Massachusetts foundry-

men present were especially solicitous that only a common code should be supported by the two organizations and in their remarks outlined the great struggle which had been gone through in Massachusetts previous to the adoption of a new safety code for foundries the past year.

C. L. Newcomb, Deane Works, Worthington Pump & Machinery Corporation, Holyoke, Mass., advocated that the code should be put over another year for further consideration and that foundrymen who were familiar with the New York, Pennsylvania, New Jersey and Massachusetts codes should be included in the committee.

Stephen French, Athol Machine Co., Athol, Mass., suggested that the members did not take interest enough in the code to study how its rules were to affect their own plants. He believed that as a result of the efforts of local foundrymen, the new Massachusetts code was the best now in existence. He urged that a common code be adopted because of the good effect upon the legislatures of a united front.

Dr. Richard Moldenke pointed out that the A. F. A. committee had all the codes before them for consideration and had drawn up a code that was as fair to the men as to the employers, which could not be said of some of the other codes. With the workmen behind the rules their enforcement would be easy.

The matter was adjusted at one of the Friday sessions, but meanwhile the discussion had consumed so much time that adjournment immediately followed. Secretary Backert at the Friday meeting reported that in the matter of safety sanitation and fire protection, a committee of three had been appointed to meet with a committee of three of the National Founders' Association, and the code that is then developed would be submitted to the members for a letter ballot. The committee of the association is composed of Earl B. Morgan, Norton Co., Worcester, Mass.; Ralph H. West, West Steel Casting Co., Cleveland, both members of the safety, sanitation and fire prevention committee, and President B. D. Fuller.

Directors and Officers

The subjoined list of directors were elected and at a subsequent meeting of the board, Benjamin D. Fuller was elected president, Stanley G. Flagg, 3d., vice-president, and A. O. Backert, secretary-treasurer. The directors are:

H. R. Atwater, Osborn Mfg. Co., Cleveland.
A. O. Backert, Penton Publishing Co., Cleveland.
R. A. Bull, Duquesne Steel Foundry Co., Pittsburgh.
Henry A. Carpenter, General Fire Extinguisher Co., Providence, R. I.
H. E. Diller, General Electric Co., Erie, Pa.
Stanley G. Flagg, 3d., Stanley G. Flagg & Co., Philadelphia.

Benjamin D. Fuller, Westinghouse Electric & Mfg. Co., Cleveland.
 Alfred E. Howell, Phillips & Buttorff Mfg. Co., Nashville, Tenn.
 C. E. Hoyt, Lewis Institute, Chicago.
 W. A. Janssen, Canadian Steel Foundries, Ltd., Montreal.
 S. T. Johnston, S. Obermayer Co., Chicago.

J. F. Kent, American Cast Iron Pipe, Birmingham.
 V. E. Minich, Sand Mixing Machine Co., New York.
 J. P. Pero, Missouri Malleable Iron Co., East St. Louis, Ill.
 Maj. Joseph T. Speer, Pittsburgh Valve, Foundry & Construction Co., Pittsburgh.
 H. B. Swan, Cadillac Motor Car Co., Detroit.

American Institute of Metals Meetings

Boston Convention Discloses Progress Made Toward
 Use of Domestic Clays in Crucibles—Shrapnel Bullets

COMPREHENSIVE and timely, the papers presented before the American Institute of Metals at its annual convention in Boston last week proved valuable contributions to metallurgical literature. The crucible situation, in view of the impossibility of obtaining clay from Klingenberg, and the electric furnace development for nonferrous metal melting, were topics indicating notable progress. Nonferrous metals used in shrapnel manufacture appear also to have presented metallurgical and chemical difficulties which, according to views brought out, have been largely overcome.

Domestic Clays for Crucibles

Clays and graphites used in the manufacture of crucibles were discussed by Prof. A. V. Bleining, Bureau of Standards, Washington. His paper, in his absence, was read by G. C. Stone, New Jersey Zinc Co., New York. The paper paid particular attention to domestic materials, some of which the author said approach the Klingenberg varieties in quality. Though no single American clay has yet been found a suitable substitute for those from Germany, he believes possible a combination of domestic varieties to form a product which will excel them.

Differentiation between crucibles for brass and for steel melting as to composition, he pointed out, is not clear. However, it appears that clays for steel melting need not possess as low a vitrification temperature, but must have a higher overfiring temperature and greater refractoriness. He also emphasized that all the factors in the construction of the crucible body and the various destructive agencies tending to shorten the life of the crucible are not understood.

Crucibles which are being dried, he declared, should be maintained for at least several days at a temperature of, say, 300 deg. Fahr. before being placed in the furnace. In Europe the crucibles on being taken from the drying kiln are sometimes covered with a water proof coat such as tar or pitch dissolved in turpentine. He also believes that preheating of the crucible before putting it into the first heat is often too abrupt, the temperature change too violent and that the ideal method would be to place crucibles in a special furnace kept heated by the waste gases of the melting furnace where the furnace could be heated up uniformly to somewhat below red heat.

The Present Crucible Situation

M. McNaughton, Jos. Dixon Crucible Co., Jersey City, N. J., discussing the present crucible situation, stated that because of the lull in the metal business the plumbago supply is larger at present than at any previous time. However, shipping difficulties, he said, may later cause scarcity. The crucible problem, he believes, cannot be solved in the laboratory, but necessary information for improving the product must come from actual service. The real problem is to find a substitute for German clay and so far progress in this line has only been in the elimination of unsatisfactory material. Results obtained by early attempts to use domestic clay were unsatisfactory. In certain cases the average heats secured were four or five as against 25 to 35 previous to the war. At the present time from 15 to 25 heats is the range of average service of size of crucibles No. 80 when used in standard rolling mill service. The conditions as to the supply of both these materials, clay and plumbago, he said, are much more satisfactory than they were a year and 18 months ago,

and the annoying shortage which prevailed during 1916 will not occur again as a result of insufficient works capacity. Crucibles, he believes, are now of much better quality on an average than during that period and the same number of crucibles will melt a much greater quantity of metal. He advised the use of crucibles as small as possible.

The Electric Furnace for Nonferrous Metals

Discussing the melting of yellow brass in induction furnaces, G. H. Clamer, Ajax Metal Co., Philadelphia, urged that manufacturers select electric furnaces particularly adapted to the work in view. No type of furnace, he said, is without restrictions and none is generally applicable to all work.

Regarding points in design, he emphasized that pinch effect and low power factor are to be avoided, and with a view to the latter the primary and secondary coils should be as close together as possible. The extreme pinch effect and low power factor obtained in the open channel type of electric induction furnaces, he believes, precludes their use for alloys of nonferrous metals.

He described the Ajax-Wyatt furnace as consisting of a horizontal bath of molten metal communicating with a vertical "V" channel, which, through the utilization of what he terms the Joule effect and motor effect, stimulates circulation of metal analogous to that of water in a boiler. Brass composed of 60 per cent copper and 40 per cent zinc he said is being melted without volatilization and to accomplish this the circulation of molten metal must be sufficiently rapid. A 30-kw. Ajax-Wyatt furnace has, he explained, a power factor of 85 per cent and a 60 kw. one a power factor of 72 per cent, the load factor during operation being 100 per cent. The quality of the product he believes equals that from crucibles, and turnings and sawings have been melted with a minimum of segregation. He added that in melting yellow brass a 30-kw. furnace will produce from 100,000 to 200,000 lb. before requiring relining; that the cost to reline is \$60, and that melting 60-40 brass 6½ to 9 lb. of metal are melted per kilowatt-hour in a 30-kw. furnace, and 9½ to 11 lb. in a 60-kw. furnace based on the weight of metal cast.

Dwight D. Miller, Society for Electrical Development, New York, pointed out that a large field is available to the electric furnace in nonferrous metal work, the object being to develop a furnace with high thermal efficiency that will melt yellow brass and obviate volatilization. He said that the electric furnace also would provide the foundry with means for obtaining daily furnace records and better technical control, and would make less likely diseases related to the industry.

The General Electric Co., he said, has a furnace which will shortly be used for melting red brass on either one, two or three-phase current. It is of the smothered arc type and has both pyrometer and wattage means of control. In melting red brass a temperature of 2200 deg. Fahr. is reached and 325 kw.-hr. per ton is required, an efficiency of 70 to 77 per cent and a power factor of 96 to 98 per cent being obtained.

The Northrop furnace of the induction type he described as a new departure which has been operating experimentally for one year. It appears to handle any kind of metal and to be capable of changing to various mixtures. It takes an oscillating current from condensers at 10,000 volts, and, he explained, has no iron core, the crucible being placed in the induction coil.

A furnace promising success, he said, is the Hering pinch effect furnace, while the Ajax-Wyatt furnace and the Baily, Rennerfelt, Hoskins and Snyder are in commercial use.

The simplicity and reliability of the Baily furnace, he believes, has been proved. The Otis Elevator Co., he declared, has a Baily electric furnace for annealing steel castings which operates on two-phase current, takes a 1200-lb. charge and develops a temperature of 1500 deg. Fahr. to 1850 deg., starting from 750 deg., the cost per ton of metal being \$7 and the power being on 19½ hr. However, he believes that the Baily furnace is inherently sluggish because of its large heat storage capacity, which, he said, is sufficient to allow the Lumen Bearing Co. to make its last heat on the stored heat of the furnace.

Two Snyder furnaces of 480-kw. capacity, he stated, are being used by the Chicago Bearing Metal Co. and have a power factor of 60 per cent, take a 2000-lb. charge of heavy leaded bronze, and require 300-kw.-hr. per ton.

The Rennerfelt furnace, he said, has not been successful on yellow brass. However, with Monel metal he claims it produced no loss of metal in three heats, the charge being 945 lb.

When using a pyrometer on heats he believes readings can be obtained quickly only when the couples are permanently installed. Dr. H. W. Gillett, United States Bureau of Mines, Ithaca, N. Y., stated that whether the spout on the electric furnace properly be left partly open or entirely closed depends on the kind of charge and the condition of operation. He believes that it is possible to install a pyrometer to show the temperature of the inclosure but difficult to put the couple in the metal. Sufficient control, he said, may be obtained by watching and regulating the power consumption. He has experienced trouble with sticking electrodes when melting charges high in zinc.

Briquetting Nonferrous Scrap

The briquetting of nonferrous metal scrap was discussed by A. L. Stillman, General Briquetting Co., New York. It is evident, he said, that if light scrap can be treated to equal heavy scrap economy will result. The briquet and bale, he emphasized, are distinctly different, the one calling for short easily fed borings and the other long flexible material. In the manufacture of briquets he believes it generally advisable not to use binders, as these, though sometimes apparently harmless, often introduce metallurgical complexities. Lead alloys and babbitt metals, he said, are easy to briquet by pressure alone and copper, aluminum and their alloys, notably brass and also iron and steel, after preliminary packing to remove included air, can be made into briquets by building up of extreme pressures which develop a strong bond of adhesion. In the case of hard bronze, milk of lime has proved an aid to briquetting.

First in importance he places the expulsion of included air in making briquets. Sudden application of force will not accomplish this and some concerns, he stated, have successfully used a slowly operated hydraulic press. He believes the most successful method of briquetting is the Ronay process, which, he said, has been adopted by the Chase Metal Works and the Scovill Mfg. Co., both of Waterbury, Conn. The author further remarked that when scrap contains oil the greater part of the oil is removed by pressing; also when foreign material is present a binder is required. Mr. Stone said that he has used a press on scrap containing foreign material with satisfactory results.

Dr. Gillett, in a paper on negative experiments on waste core sand, pointed out that experiments made on burnt core sand gave no promise for the commercial utilization of burnt sand; neither did they throw any light on the process of deterioration of the sand. In the particular sand used no benefit was derived from burning off the carbon, and heating new sand to a comparatively low temperature increased the amount of oil needed.

Stellite was discussed by Elwood Haynes, Haynes Stellite Works, Kokomo, Ind. He said that he has made cast stellite bars capable of withstanding greater pres-

sure than high speed tool steel, and has found the addition of iron necessary when used in saws. He advises consumers not to remelt the material, as melting in graphite crucibles adds excessive carbon, and he suggested that old material for remelting be returned to the factory. The crucible method of melting stellite, he said, was being used exclusively in the factory, the electric furnace which was installed not having proved satisfactory. Jesse L. Jones, Westinghouse Electric & Mfg. Co., East Pittsburgh, remarked that by coating stellite with manganese bronze it may be welded to steel.

Bullets for Shrapnel

Harold J. Roast, Jas. Robertson Co., Ltd., Montreal, described some irregularities met with in the manufacture of British shrapnel composed of 12.5 per cent antimony and 87.5 per cent lead. In melting and mixing these metals, he said, first a little lead is melted in a pot to conduct the heat, then antimony is added and finally the remainder of the lead. Rods drawn from this, he stated, showed considerable variation in composition due to the segregation of the antimony on standing in the cylinder of the rod press for cooling, though the mixture in the melting pot was continually stirred. Casting slugs in a special water-cooled mold he found obviated this segregation.

In casting bullets, he pointed out, the predominant cause for variations in weight is variance in size of bullets and if the mixture in the melting pot is kept properly mixed no variation in composition will be experienced. Variation in the analyses of antimonial-lead alloys as made by the manufacturer and inspectors, he said, led him to investigate the cause. He prepared a sample of lead and antimony of known composition, which he subsequently had analyzed by four different analysts. The results received, he said, did not agree, two analyses rejecting the bullets and the other two accepting them.

C. P. Karr, Bureau of Standards, Washington, said that he has used antimony in powdered form, thereby improving the metal, but that this was done in laboratory work and not commercially. Mr. Roast believed that the likelihood of losses of antimony in powdered form would make this method impractical. He also explained that he prevents segregation of metal by constant stirring of the molten mass in the pots from bottom upward with an iron skimmer, together with the means previously described. Other discussion indicated that stirring from the bottom and up is necessary to homogeneity.

Charles Pack, Doehler Die Casting Co., Brooklyn, N. Y., explained that he uses a circular stirrer which throws the metal upward. He believes that temperature of the metal is important, and that when this is low trouble may be experienced. He is now having trouble with the use of American antimony. W. A. Cowan, National Lead Co., Brooklyn, believes that the proper method of preventing segregation is by heating first the metal of lower melting point, in this case lead, to a temperature above the melting point and then dissolving in this the metal of higher melting point, or in this case antimony. Mr. Roast stated that he has been using Chinese antimony.

Products of Aluminum

F. G. Shull, Aluminum Co. of America, Boston, discussing recent industrial uses of aluminum, stated that for a long time it has been considered difficult to die-cast aluminum, but that now this problem seems to have been solved, as there are several companies that claim to be successfully die-casting this metal. Another recent development, he said, is the subjecting of sand castings to a very high pressure to render the metal more dense and increase its strength. This, he explained, is being done in making parts for timing devices of shrapnel. The most interesting development in the aluminum industry, he believes, is the rolling of high alloy rods in practically all commercial sizes, which process tends to work the entire mass of the rod so that the finished material is homogeneous. This rod, he believes, will find a field in automatic machine and turret lathe products.

Test Bar Results Inapplicable to Castings

Differences in results obtained from tests on samples taken from actual castings and those made on test bars were pointed out by W. M. Corse, Titanium Bronze Co., Niagara Falls, N. Y. He described results of a series of tests made on alloys of copper and tin showing that the tensile strength of the casting was consistently and considerably lower than those of test bars taken from the same heat. In one case the test bar showed 42,200 lb. per sq. in. and the casting only 27,200 lb. Also the per cent elongation was consistently low for castings. A test of aluminum bronze, he said, showed 92,000 lb. sq. in. tensile strength for the test bar and only 78,000 lb. for the casting.

He urged that designers refrain from using test bar results in their calculations and substitute instead values obtained from castings. He also emphasized that average results from tests should not be used for minimum requirements as these cannot always be obtained in practice.

Paul McKinney, United States Naval Gun Factory, Washington, pointed out the necessity of educating the designer to Mr. Corse's viewpoint. Engineers, he said, are prone to follow Kent's "Mechanical Engineers Pocket Book," and in consequence good castings are sometimes rejected without justifiable cause. A cast test bar, he explained, is theoretically correct from a casting viewpoint, and may be expected to give better results than is obtainable from castings which do not have theoretically correct feeders or provision for shrinkage and are also likely to be porous.

Mr. Corse added that photomicrographs were not taken of the test samples but he believes that these would show defects in the shrinkage of the castings. High shrinking alloys, he explained, will show up such defects without the aid of the microscope, but low shrinking alloys will not, as in them the shrinkage is inter-crystalline and the shape of the casting is retained, so that to the naked eye it may appear perfect. Another point suggested in the discussion was that shrinkage may be compensated for by annealing.

Fluxes for Nonferrous Metals

The use of fluxes in brasses was discussed by E. D. Frohman, S. Obermayer Co., Pittsburgh, whose paper was read by H. S. Gulick, More-Jones Brass & Metal Co., St. Louis. The use of fluorspar and lime in brasses, he believes, is wrong and charcoal placed on top of the metal, he said, will eliminate oxides. His company has a product which he stated produces carbon monoxide to reduce oxides.

Mr. Gulick, commenting on the paper, said fluorspar is not a direct reducing agent but acts to liquify the slag especially when used in iron. He questioned the practicability of using charcoal as suggested, and expressed the opinion that several fluxes on the market have no real value as such. He cited one case where a flux contained 95 per cent silica and was claimed effective on aluminum. He believes that manganese and phosphorus must be used in badly contaminated metals.

Jesse L. Jones regarded the Obermayer product as effective. When coke and clay are ground and added, he said, a good covering is obtained which prevents oxides. W. Frank, Damascus Bronze Co., explained that he has had considerable trouble with slag in melting furnaces, but that the Obermayer's solution is now keeping them clean. G. H. Clamer, Ajax Metal Co., Philadelphia, pointed out that removal of sulphur is important as well as the removal of oxygen and that when sulphur is present without oxygen it is more dele-

terious than when oxygen is present. This, he said, is true in iron as well as copper.

Some troublesome experiences with a scrap reclamation plant, particularly in the use of slags, were described by W. H. Parry, National Meter Co., Brooklyn, N. Y. In the discussion, Mr. Roast said that the fluxes which Mr. Parry found unsatisfactory have been successfully used on other work. He also believes that the reflecting pyrometer determines temperatures at local points with sufficient accuracy. Mr. Parry added that the spillings and slags used in the reclamation plant are put through cinder crushers so there is as little slag as possible in the charge. He also removes all removable dust and mixes one part of fine material with two parts of coarse and gets good results.

John P. Goheen, Brown Instrument Co., Philadelphia, stated in his discussion of pyrometers that no tube covering for a pyrometer couple can be immersed in molten brass. He also showed a Japanese protecting tube which is being used.

Economies in Foundry Practice

Dr. C. F. Hirshfeld, Edison Illuminating Co., Detroit, discussing the subject of electrically heated core ovens, stated that variations in strength of cores of 30 per cent were obtained by slight variations in baking conditions, and that the use of electricity should lessen this variation. All apparatus required for using electricity, he said, is developed and available.

H. M. Lane discussed brass foundry core making. Because of the value of the final product, he said, brass manufacturers have paid little attention to core making, yet considerable saving can be realized in this work. He has accomplished this, he explained, in one case by eliminating walking, and in another by rearranging apparatus to make material more accessible, in the latter case reducing the force from 11 to 7 men. To use a lift truck, he pointed out, the floor should be smooth and he has for some floors found desirable the use of steel. Rubber wheels on lift trucks, he declared, have been used by him with satisfaction, no trouble being experienced in the baking room. He found that in the breakage of cores 5 per cent occurred in hand handling and 2 per cent in rack handling.

Secretary's Report and New Officers

The report of the secretary, W. M. Corse, showed an increase in membership over that of last year. At present he said the society has 282 active and 64 associate members, a total of 346 and an increase of 69 members. Twenty-eight corporations are now members whereas last year only 19 were included. The society, he added, has adopted the plan of issuing a quarterly journal.

Officers elected for the ensuing year follow:

President, W. M. Corse, manager, Titanium Bronze Co., succeeding Jesse L. Jones, Westinghouse Electric & Mfg. Co., East Pittsburgh.

Secretary and treasurer, Fred L. Wolf, manufacturing engineer, Ohio Brass Co., Mansfield, Ohio.

Vice-Presidents: William B. Price, chief chemist, Scovill Mfg. Co., senior vice-president; George K. Burgess, Bureau of Standards, Washington; H. J. Roast, Jas. Robertson Co., Ltd., Montreal; J. P. Salter, Ohio Brass Co., Mansfield, Ohio; W. A. Cowan, National Lead Co., Brooklyn, N. Y.; H. S. Gulick, More-Jones Co., St. Louis; C. W. Johnson, Westinghouse Electric & Mfg. Co.; H. A. Wentworth, American Zinc Lead & Smelting Co., New York; F. L. Antisell, Raritan Copper Works, Perth Amboy, N. J.; G. M. Fritch, American Brass Co., Kenosha, Wis.

Exhibit of Equipment for the Foundry Industry

Leading Points of Products Shown in Boston
Last Week for the Foundry and Machine Shops

THE Foundry Exhibition that held so large a part of the interest of the visitors to the joint convention of the American Foundrymen's Association and the American Institute of Metals at Boston, will pass into history as one of the most notable in the annals of the

foundry industry. Its chief interest lay not alone in the new products shown, but also in the excellence of the decorations and in the increased number of exhibitors who ten or twelve years ago would hardly have dreamed that a foundry or a foundry manager

would be sufficiently important to warrant the time and expense involved in some of the exhibits this year.

New products were fewer in number than in former years. Various causes contributed to this condition. Transportation difficulties delayed new machinery that would have been shown, but the great pressure of the past year for increased production has temporarily put a stop to new development, especially in machinery lines. Several of the exhibits suffered on account of the fact that the Government is now absorbing most of the output and most of the energy of builders of equipment.

The daily program in one respect emphasized the war spirit. Each morning the American, British and French flags were unfurled to the martial strains of bugles blown by members of the Marine Corps. Flown from hollow staffs, they rippled in breezes created by General Electric blowers and the American flag shone resplendent in the rays of a Western Electric-Davis floodlight thrown upon it from the nearby booth of the American Lighting Co. Flowers and potted plants made a scene of beauty where the uninitiated had expected to see a dull and drab array of machines, pig

Another new machine shown by the same company was a jolt stripper. This machine utilizes but one piston to jolt and draw the pattern. In the stripping operation the flask is raised to its full height by four rods and the pattern is drawn by exhausting the air from the cylinder. Spring-actuated dogs automatically engage milled slots in the four steel stripping rods. The machine has no auxiliary cylinders and no bell cranks or levers and an extra long guide permits extreme pattern draft.

The Herman Pneumatic Machine Co., Pittsburgh, is making a jar-squeeze machine, either portable or stationary, which is operated by a single cylinder for both jarring and squeezing, has an automatic control valve and also has an improved locking device to provide rapid and easy adjustment of the squeezing head. It has a single piece base and resilient jarring surfaces. The company also showed two sizes of plain jarring machines.

An interesting machine developed especially for the Ford Motor Co. was shown by Henry E. Pridmore, Chicago. This is a jolt-stripper in which the jolting



Grand Hall, Part of Which Is Here Shown, Was One of the Four General Divisions of the Exhibit

iron, coke, sand and the usual foundry equipment. Even the working exhibits were made attractive.

In this review we can only emphasize the products which were new to the foundry craft or new to the delegates because they had not been shown in former exhibitions. Simplification of operation, refinement of construction and increased protection of moving parts against the attrition of sand and dirt were new talking points.

Molding Machines

A new machine shown by the American Molding Machine Co., Terre Haute, Ind., was of the jolt rock-over type. The rock-over feature is new. The mold rocks up on a center at the foot of the rocker arm, but as it begins to descend an auxiliary arm automatically takes up the load on a second center, doing away with springs entirely. An automatic latch and an oil-balancing cylinder play their part in controlling the rock-ing operation. The rocker arm clears the table so that a 5-ft. mold can be made on a 3-ft. table. After the mold is turned over it rests upon a hinged socket member which automatically compensates for any irregularities of the flask or mold and does away with the need for any hand leveling operation. A single cylinder performs both the jolt and drawing operations and the mold is balanced at the center so that little force is required to rock it over.

mechanism is motor driven and the stripping plate operated by air. The gears actuating the jolting mechanism run in oil and the control of speed is by means of a friction clutch. Four 4-in. air cylinders perform the stripping operation and the size shown has a 6-in. draft. The pattern shown on the machine was a Ford housing. A sectionalized aluminum model of an electric jolt-ramming machine aroused much interest. Several other models of the well-known line of this company were in operation and a variety of castings were shown.

The William H. Nicholls Co., Inc., Brooklyn, N. Y., had in operation a combination jolt-squeeze-stripping plate machine in which the pattern was drawn by a gravity device. A power squeezer and a jolt-squeezer were also in operation. This exhibit was to have included a jolt-squeezer with a new rollover device, but this particular machine was lost in transit—a fate which marred several other exhibits. This exhibitor also showed daily in a nearby theater a film of molding and foundry operations in several foundries.

A power squeezer shown by the Berkshire Mfg. Co., Cleveland, Ohio, is equipped with an air vibrator, an improved knee valve, and has as a special feature a hinged lift for rolling the cope out of the way so that the pattern plate can be removed for core setting and the cope returned to position.

The United States Molding Machine Co., Cleveland,



A Glass House Was Used to Illustrate the Efficiency of Automatic Sprinklers

Ohio, besides its regular line of plain and combination machines, exhibited a new jolt, pattern-drawing machine used in connection with a stripper.

One of the most unique machines exhibited was shown by the E. J. Woodison Co., Detroit. This was a new type, all motor-driven machine with the motor mounted on a column placed beside the table. The roll-over is operated by a cable running on a drum on the cam-wheel shaft. The jolt is produced by a cam-wheel mechanism and a special feature of the machine is a dial registering the number of blows. It is claimed that this device, in connection with the simplicity of the other features of the machine, enables it to be operated by a man of the handy-man type as the pattern can be marked with the number of blows necessary for correct ramming and no experimental work is required the next time the pattern is put into use. The pattern is drawn by a socket wrench attached to a shaft, this operation being done after the mold is rolled over.

The Mumford Molding Machine Co., Chicago, showed only a model of its plain squeezing machine with a variety of drawings of its latest model, but announced that it has three new machines under development and expects to place the first of these on the market in about three months.

Richey, Browne & Donald, Inc., Maspeth, N. Y., showed a roller-ramming machine. The machine in operation was a small model and a similar model of the company's sand handling apparatus was also displayed in operation.

Comprehensive exhibits of their varied lines of plain and combination machines were also made by the Osborn Mfg. Co., Cleveland; the Arcade Mfg. Co., Free-



An Obelisk of Fuel Was a Feature of a New England Exhibit

port, Ill.; the Midland Machine Co., Detroit, and the B. & B. Mfg. Co., Indianapolis, Ind. Many of these machines had minor improvements added in the year. Details of these and other exhibits appeared in the Sept. 20 issue of THE IRON AGE. The International Molding Machine Co., Chicago, and the E. H. Mumford Co., Elizabeth, N. J., showed photographs of the machines made by them. Vibrators were shown by the Malleable Iron Fittings Co., Branford, Conn.; the Federal Foundry Supply Co., Cleveland, and the Buckeye Products Co.

Sand Blasting Apparatus

The magnitude of the sand-blasting exhibits rarely failed to create comment by visitors. The big machines, many of them in operation, were an unending source of interest and the many varieties displayed were in themselves indicative of the fast-growing importance of this method of cleaning castings. The trend toward sand-blasting equipment which permits the operator to perform his work without exposure to the dust was manifest. Even if the actual exhibits had failed to carry conviction of the possibilities of the apparatus, the photographic evidence of the large installations in some of the most famous foundries of the country could not have failed to stimulate the interest of possible users.

In the "Humane" sand blast room, shown by the American Foundry Equipment Co., New York, the work is loaded upon a rotary table and the operator, while viewing the work through a bronze screen, directs the sand stream upon it from a nozzle inserted through a split rubber curtain. Another new machine, not before shown by this company, is an automatic sand blast tumbling barrel. This is a self-contained unit operating on the pressure system which is claimed to produce a large saving in air consumption. The sand tank is located in a pit below the machine and there is no elevating system required. An automatic filling valve is a special feature. When the machine is in operation the air pressure closes this valve, but as soon as the pressure ceases, the valve automatically opens and permits the sand to flow from the hopper into the tank. An automatic release valve permits the air to exhaust from the sand tank when the machine is not in operation, thus preventing clogging of the blast lines. Other standard types of sand blast equipment were also shown.

The New Haven Sand Blast Co., New Haven, Conn., besides showing its sand blast barrels, exhibited a new type of mixing valve in which the sand entered through two ports in the side of the mixing chamber instead of the top, thereby eliminating the possibility of choking the valve by an excessive accumulation of sand in the sand feed pipe.

A revolving-barrel sand-blast machine was shown by the Brown Specialty Machinery Co., Chicago. The sand flows by gravity from the main hopper to the auxiliary hoppers and thence to the nozzles, insuring a positive feed. The air consumption is claimed to be notably low. Other large exhibits of sand blast equipment were made by the W. W. Sly Mfg. Co., Cleveland; the Mott Sand Blast Mfg. Co., Inc., Brooklyn, N. Y.; the Hoevel Mfg. Corporation, New York; the J. W. Paxson Co., Philadelphia, and the MacLeod Co., Cincinnati.

Photographs of sand-blast machinery were shown by the Whiting Foundry Equipment Co., Harvey, Ill., and the Pangborn Corporation, Hagerstown, Md. The latter exhibit was an unusual photographic display, as it showed not only enlarged photographs of the apparatus made by the company and the new plant in which the machines are built, but also a large collection of photographs of installations in foundries in many parts of the country. Especially interesting were the installations at the plant of Isaac G. Johnson & Co., Spuyten Duyvil, N. Y., and the Pratt & Whitney Co., Hartford, Conn., and a view of the dust exhaust-arrester at the Buick Motor Co., Flint, Mich., which exhausts the air from eight sand blast rooms, separating the dust and returning the air directly into the factory.

Sand blasting materials were shown by the Harrison Supply Co., Boston; the Pittsburgh Crushed Steel Co., Pittsburgh; the Portage Silica Co., Youngstown, Ohio,

and the United States Silica Co., Chicago. W. F. Stodder, Syracuse, N. Y., displayed the Cyclone sand blast nozzle.

Core Ovens and Binders

Several exhibitors proved that the makers of core ovens have not been idle the past year. Several new core binders also made their appearance.

The oven that was the most radical departure from the ordinary kind was located in the exhibit of the General Electric Co. This was an electrically heated oven made by the Oven Equipment & Mfg. Co., New Haven, Conn., and equipped with General Electric heating elements. A close control of temperature is obtained through the automatic action of a pyrometer made by the Taylor Instrument Co., Rochester, N. Y., allowing for precise baking of cores of varied constituents for special purposes.

A new exhibitor was the G. S. Blodgett Co., Inc., Burlington, Vt. Three galvanized sheet-steel ovens with air-cell asbestos linings were shown. These are designed to burn either gas or coal. The ovens have been employed for japanning and enameling.

The Foundry Equipment Co., Cleveland, displayed a combination unit of a Coleman rolling drawer oven and a portable rack oven. The door of the latter section was hung on a separate frame and one locking device locked the door at four points at one operation. Although only 1 in. thick, it was claimed that the insulation was equivalent to 10 in. of firebrick.

A core oven displayed by the W. W. Sly Mfg. Co., Cleveland, included two units of six 8-in. drawers each. A special feature is the ease with which by the removal of a few parts drawers of any required height can be substituted for the 8-in. drawers. The grids roll on small trucks, the axles of the trucks traveling in slots in the grids. The trolleys by which the front of the drawers is supported have roller bearings and have three wheels. An exhibit of its Acme core ovens was made by the Monarch Engineering & Mfg. Co., Baltimore, Md.

Three new core binders were the Kordek brand, displayed by the Corn Products Refining Co., New York; the Corul brand, shown by the Swan & Finch Co., New York; and the Argentine brand shown by the Werner G. Smith Co., Cleveland. New forms of vent waxes for cores were shown by the United Compound Co., Buffalo, N. Y.

Sand Handling Equipment

The Sand Mixing Machine Co., New York, had its older type of traveling machine in active operation most of the time, but had also on display a new machine that is a departure in many respects from the former model. It has a device for piling the sand alongside of a bench or machine after cutting.

In the exhibit of the Great Western Mfg. Co., Leavenworth, Kan., in the last two days of the convention, appeared a new type of gyratory riddle designed to be swung from a column or wall on a hinged bracket to permit riddling directly over a mold. This machine is hardly out of the development stage yet, but its designers foresee for it a field auxiliary to that of the various types of gyratory riddles of which this company is one of the prominent makers. Electric sand shakers were also shown by the Champion Foundry & Machine Co., Chicago; Brown Specialty Machinery Co., Chicago, and Chicago Pneumatic Tool Co., Chicago. A large sand muller was shown in operation by the National Engineering Co., Chicago. Its well-known core sand mixer was shown in operation by the Blystone Mfg. Co., Cambridge Springs, Pa. A special type of sand handling machine was shown in a small operating model by Richie, Browne & Donald, Inc., Maspeth, N. Y.

Molding, facing and core sands were shown by several exhibitors, both producers and supply houses. The Albany Sand & Supply Co., Albany, N. Y., gained much attention by its exhibit of a Crawford range, cast in Albany sand by the Walker & Pratt Mfg. Co., Boston. The J. W. Paxson Co., Philadelphia, drew attention to the mechanical methods of sand production at various banks controlled by the company by means of an automatic projectorscope.

Conveying Equipment

Man shortage has aroused an interest in conveying equipment to-day that is probably as great as in that of any other part of a modern foundry equipment.

One of the new things shown was a light capacity hoist made by the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., to fill the need for a hoist to lift loads a little too heavy for one man, but too light for the economical use of the standard larger types of hoists. The hoist shown was designed especially for cleaning and core room use and is made in three sizes, 500-lb., 1000-lb. and 2000-lb.

The Curtis Pneumatic Machinery Co., St. Louis, had an exhibit of pendant vertical cylinder air hoists; a horizontal rope compounded cylinder air hoist suspended from single I-beam trolleys; a single I-beam hand-operated bridge crane with trolley, and a single I-beam bracket jib crane. The Whiting Foundry Equipment Co., Harvey, Ill., showed one of its latest improved designs of electric crane trolley which has all gearing inclosed. Cyclone high-speed chain blocks were displayed by the Chisholm-Moore Mfg. Co., Cleveland, in connection with Matchless trolleys.

The Abell-Howe Co., Chicago, had in operation an American electric hoist and made a special feature of the Howe detachable-tongue one-man trucks. American high-speed chain and Union pressed steel rivetless chain were also included in this exhibit. The Lewis-Shepard Co., Boston, showed the varied uses and large capacity of the Jacklift master trucks. The Lamson Co., Boston, had a special installation of its gravity roller conveyors adapted for carrying molds, cores, castings, pig iron, etc. In connection with this was shown its booster type of conveyor designed to elevate material to a height necessary to give a good pitch for the gravity roller conveyor, or to convey materials from one floor to another. Another part of this display was an exhibit of the Lamson pneumatic carrier system for conveying messages and reports. The Hayward Co., New York, had a set of photographic views of its Hayward buckets.

General Foundry Equipment and Supplies

As usual, the displays of foundry supplies were numerous and varied. As was to have been expected, the larger displays were by local exhibitors, many from distant cities turning their booths into rest rooms and showing little except photographs and literature.

The Cutter & Wood Supply Co., Boston, had a comprehensive display of the many lines of foundry equipment, tools and materials of which they are agents. The S. Obermayer Co., Cincinnati, Ohio, occupied a large space and showed a variety of small supplies as well as power and foot-power sprue cutters, rosin mill and other machinery. The J. W. Paxson Co., as a part of its display, had a new tool called a "core buster." This tool is air-driven and its special feature is a clutch to hold the tool in a fixed relation to the cylinder when in operation digging out cores. Stanley Doggett, Inc., New York, made a special display of Facamold, a facing compound composed of graphitic soapstone, which it is claimed will do the work of graphite at considerably less cost.

[Pressure on space makes it necessary to hold for next week's issue a review of the machinery and other exhibits.]

Because of lack of coal for its by-product coke plant, one-half of the Cleveland plant of Corrigan, McKinney & Co. has been shut down for more than a week and there is no prospect of an early resumption. One-half of the coke ovens, 102 ovens, are thus out, two blast furnaces are banked, and six of the open-hearth furnaces are not in operation.

The Smiley Steel Co., Inc., has removed from 120 Broadway to larger offices at 111 Broadway, New York, and will occupy rooms 916-918 at this address. The company has recently increased its capital from \$100,000 to \$1,000,000.

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THE IRON AGE

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Steel Resales and Commissions

The machinery involved first and last in carrying out the new Government program on iron and steel prices is highly complex. In formulating a schedule of rules that shall apply to sales of iron and steel by others than producers, the Government will have to recognize that these factors are divided into different classes and that no one rule will apply to all. These middle interests or selling agents must be recognized as a part of the machinery by which business is conducted.

The authorities at Washington have not thus far addressed themselves seriously to this subject. In copper, in coke, in pig iron and in steel they have negotiated only with producers, and hints that have been dropped indicate that the importance of other classes of business men in these industries has not been fully grasped. For instance, the announcement a fortnight ago regarding the agreement on copper contained the statement that the copper producers "would take the necessary measures, under the direction of the War Industries Board, for the distribution of the copper to prevent it from falling into the hands of speculators who would increase the price to the public." Again, during the negotiations between the Washington authorities and the steel producers the question was asked steel producers whether it would be feasible to eliminate sales of steel to jobbers.

It is of the utmost importance that Washington should recognize that a rule applicable to one class of business may be altogether inapplicable to another class. Thus there is no relation whatever between the dealer in coke and the dealer in steel bars or plates. Either may be called a dealer or a jobber, but there is the additional divergence that in coke there has commonly been business done on a brokerage basis, whereas in steel bars there is practically no brokerage business.

One of the primary distinctions to be made is on the basis of the method in which the business is done and the means adopted for providing compensation for the service rendered to industry. Thus in the case of coke there is the factor who operates in furnace coke practically as a broker, buying at one price and selling at another, the difference be-

tween the prices being tacitly recognized as a brokerage even though it is not thought of in terms of a percentage, the sales being made indiscriminately to one blast furnace or another, while there is also the dealer in foundry coke, who transacts business in technically the same manner, but really has his regular customers, who always buy through him. In pig iron the factor sometimes acts purely as a merchant, buying at one time and selling at another, while in other cases the factor is sales agent for a furnace, with or without exclusive territory, and is paid a commission, which in essence is in the same category as the salary that would be paid a sales manager. Then there is the jobber in steel products, who is in substance a dealer, with his goods behind the counter.

In the matter of prices there is a wide range. The coke dealer or broker may frequently buy at an inside price, somewhat lower than that at which the coke operator would sell direct to a consumer, while the jobber in steel products frequently pays a higher price than that at which the mill sells direct to a large consumer. It is the usual case in a rising market that the mills sell bars, sheets, etc., for shorter periods to jobbers than to manufacturing consumers, and thus the jobber pays the higher price, yet his business is profitable because he renders service by furnishing deliveries.

There is normally much more speculation in the non-ferrous metals than in iron and steel commodities. It is important that speculation be prevented, but it could easily occur that restrictions quite necessary in the case of one commodity would work great injury in the case of another commodity. It is conceivable, for instance, that if copper producers were forced to sell to all inquirers at 23½ cents the supplies would be bought up by speculators and the price to the public would be increased. There is no such prospect in the case of steel bars and very little prospect in the case of pig iron.

The great class of business men who are neither producers nor consumers of coke, pig iron and steel products have been puzzled, since price-fixing began, to determine what treatment is to be accorded them, and what restrictions there will be upon their activities. The manner in which the prices on iron ore, coke, pig iron, bars, shapes and plates

were announced at Washington has tended to increase the confusion, as these commodities were mentioned together, as if the prices for them had been reached in the same manner, whereas the legal fact is that the Administration had full power, under the Lever act, to fix the price of coke, whereas in the case of the other commodities it depended upon a mutual agreement. Coke dealers naturally concluded that it would be illegal for them to sell coke at a price higher than \$6 but assurances from Washington indicate that they will be allowed to charge a fair commission.

Some dealers in pig iron at once reached the conclusion that it would be improper for them to sell pig iron at higher than the prescribed prices, although they were not parties to the agreement, and when the Government has no authority to punish a violation of the price agreement, on the part of a producer, it certainly has no authority to question the sale of pig iron by a merchant or a consumer. The motive of such holders of pig iron who refrain from selling may be one of patriotism, a desire to further the general work in which the Government is engaged. It is not for the best interest of business that all such transactions should be foregone, and there should be regulations whereby desirable business will be encouraged and enabled to pay its way.

The normal function of one who transacts business in a commodity which he neither produces nor consumes is that of finding the buyer effecting the sale. When he is paid for the service he is paid, in essence, by the former owner, not the new owner. In recent times in the turning of trade practice upside down this man frequently has been paid for buying the commodity. Necessarily, in the reform in the market that has been undertaken, he must be set back to his original position and made to perform his normal function. In the case of coke, the price of which is absolutely fixed, the commission must in future come from the coke producer, unless the Government should establish a dealer's margin, and latest advices are that this probably will be done. Unlike the case of furnace coke, the great bulk of the foundry coke is sold through dealers, and in fixing the necessary differential between furnace coke and foundry coke the Government should recognize this fact and make the differential sufficient to include the dealer's compensation.

The jobber in steel products stands in a totally different position. He buys at what is essentially a wholesale price and sells at what is essentially a retail price. Government prices being fixed are nothing to him except as buying prices, and one of the uncertainties of this jobber is whether he will even be enabled to buy at the fixed price. If the problem of the jobber is attacked scientifically and upon the principles of good business, the matter of distribution will be found to be of prime importance. The general public must be protected against the condition of prices being fixed, and there being no place at which a purchase can be made, and that part of the public which normally buys from the jobber must be protected by the jobber being furnished the material for distribution. The Priority Board should work hand in

hand with the producers and should also be receptive to the representations that may be made by buyers, the distributors as well as the manufacturing consumers.

Coke a Dominant Factor

Nothing has been clearer than that the production of pig iron in the past ten months or more has been simply a function of the production of coke. The statistics have shown that since our production last October at the rate of 113,189 tons of coke and anthracite iron daily, or 41,000,000 tons a year, including charcoal iron, the production has been less than the capacity of the furnaces available. Half a dozen new furnaces were completed soon enough thereafter to have made a distinct impression upon the total output, and yet, in general, production has been markedly less, month by month, than the output a year earlier.

There has been some criticism of the \$6 coke price fixed last week by the President, on the ground that it was quite high relative to the price that had previously been fixed upon bituminous coal; but the whole operation of marshalling industries for the furtherance of the war is one of give and take, and if a \$6 price encourages the production of coke the vital element is given proper recognition. There has been an interesting divergence of opinion expressed as to whether the fixing of this price, to supplant the very fancy prices formerly obtained, will operate in itself to increase or decrease the production.

One principle should be accepted—that when the blast furnacemen and steel producers have so freely consented to a radical reduction in their selling prices, they should have the co-operation of all the Government agencies, to the extreme limit, in the direction of their output being increased. Their profit per ton is substantially fixed by the price agreement entered into, and their tonnage should now be made as large as possible, both for the successful prosecution of the war and as a measure of economic justice to the iron and steel producers, for steel production has suffered just as pig iron production has suffered.

Apart from considerations growing out of the price regulation there are prospects of a material increase in coke production through the completion of additional by-product ovens in various districts, the most important single operation being the Steel Corporation's plant at Clairton, the first unit of which is expected shortly to be in service. There is reason to hope that the close of the Lake coal shipping season will result in better coal supplies, so that all by-product ovens may be fully served with coal. Given an adequate supply of coke, the blast furnaces can probably produce pig iron at the rate of about 42,000,000 tons a year, in the long run, against the average of about 39,000,000 tons this year. One threatening element is that with the frequent bankings that have had to be resorted to of late, furnace linings have been abused and many furnaces will not show the tonnage per lining they have achieved in the past. Relining jobs are particularly difficult at this time.

The Machine-Tool Industry and the War

The tax upon the machine-tool industry of the country resulting from the tremendous war program of the nation is beyond all precedent. The volume of purchases to equip munition plants which took Allied war contracts in 1915 and 1916 was exceptional, but it has been surpassed or soon will be by the demands which have arisen since our Government declared war.

The recent announcement from Washington that the machine-tool requirements of new ordnance plants would approximate \$25,000,000 is but one concrete measure of present huge demands. The purchases of machine tools for the airplane program alone run into many millions of dollars, while the making of projectiles, shells, rifles, machine guns, ammunition, gun carriages and mounts, marine engines, gun sights and submarine periscopes—all apart from the torpedo-boat destroyer program of the Navy Department and the merchant-ship program of the Federal Shipping Board—have combined to create an unprecedented situation in the machine-tool trade.

Rising costs have kept pace with increasing demands until now some tools are selling at two or three times their normal value. In most instances prices to-day represent higher cost of labor and raw materials, but fictitious values are not unknown and are not surprising, in view of the fact that consumers have been bidding against each other for tools of which there is a marked scarcity. Prices have also been inflated by speculation, which the builders have vainly sought to prevent.

Deliveries, too, have been advanced farther and farther by the preference given to Government orders, so that manufacturers now engaged on Government work must wait a year to two years for some much-needed tools. Indeed, the situation has become a desperate one for a good many manufacturers, some having deliberately sought Government contracts in the hope that thereby they might receive special treatment in the matter of machine-tool deliveries.

With machine-tool plants loaded up with orders for many months ahead, it is remarkable that the Government plans have been carried out with so little interruption. So many tools have been commandeered for Government work that machine-tool men themselves have been wondering how future requirements are to be taken care of. As there are few tools left to commandeer, questions of priority must now arise with greater frequency.

When representative tool builders were hastily summoned to New York recently to submit propositions on a thousand tools for a Government airplane motor plant in France, the query, "Where will the Government get the tools?" was general; but the situation was met successfully, as previous ones have been and the tools were obtained in the shortest time on record for such a large order. This work took priority over many other Government projects and in many instances deliveries in 30 days were required.

Production of tools, while not keeping pace with demand, has been quickened to a large extent. Various means have been employed—night shifts, bonuses for overtime and larger individual produc-

tion, also the "farming out" of work. The result is that the nation's output of machine tools has been doubled and possibly in exceptional instances trebled in volume.

Many of the plants for which machine tools are now required in such large numbers are admittedly but temporary. They will be dismantled after the war, as some Canadian munitions plants are already being dismantled. The condition of the machine-tool trade after the war, therefore, is a matter to which builders are giving serious thought, as they have done for the past two years whenever peace talk was in the air. It is certain that thousands of machine tools will be thrown upon the second-hand market when war demands have ceased; but this does not greatly disturb makers, for at the same time there are indications that prosperity for the machinery trade will last for at least a few years after the war.

Considering the domestic situation first, it seems probable to many in the trade that there will be a good demand after the war for tools, both from those now engaged on Government work and those not so engaged. The first class are driving their equipment hard, and much of it must be replaced by new when peace readjustments take place. Then there are certain shops which have bought second-hand machinery during the war because of difficulties in obtaining new machines. These concerns will doubtless be a large buying factor when conditions get back to normal. Some manufacturers, moreover, are not reaping golden war profits, and, therefore, are not able to pay present war prices for tools. These must eventually renew their equipment.

Large foreign buying is also counted on as a factor after the war. At present there are many unfilled orders from abroad. Even before the embargo, American builders of tools were indifferent to a large part of the foreign inquiry, but this must be taken care of when it is possible to obtain assurance of shipments.

From the machine-tool builders' point of view, the situation presents very satisfactory aspects, with raw material costs as the most serious of the unfavorable circumstances. Government work seems likely to keep plants going to capacity for a year or more regardless of the duration of the war.

CORRESPONDENCE

Helping the Enemy

To the Editor—In the editorial in the issue of Sept. 13 entitled "Playing Into Enemy Hands," THE IRON AGE suggests that the advocates of the metric system are ignorant of the complexities of manufacture and of the disastrous effects of a wholesale change in shop standards.

There is no question of this ignorance. Let anyone who doubts it recall the names of those prominent in the metric organization and he will find few who have other than professional occupations. Their work is mostly research. One evidence of their ignorance of the complexities of manufacture has recently been pointed out by F. A. Halsey. He calls attention to the fact that the metricists are now proposing the retention of our actual dimensions, expressing them in metrical equivalents.

Dr. Kunz in stating that "American manufacturers and American soldiers, if called for service in France, would encounter grave difficulties because of this lack of a unified system of measurement" has grasped only half of his opportunity. Certainly he should advocate the adoption by the United States of the French language, for what is more lacking among the Allies on the western or any other front than a unified expression of speech. He forgets that what unifies all of those forces is a singleness of purpose, and this will overcome all grave difficulties.

H. D. MURPHY.
Jersey City, N. J., Oct. 1, 1917.

MACHINERY CLUB OPENS

New Chicago Organization Started Under Most Auspicious Conditions

The formal opening of the club rooms of the Machinery Club of Chicago took place on the evening of Sept. 29, the event being the fruition of hard work during 18 months by a small group of machinery and supply men. Their efforts, under the leadership of Clyde W. Blakeslee, of the Abrasive Co., have created an organization with over 500 members, housed in comfortable and attractive quarters in Machinery Hall, Washington and Clinton streets. A dinner, at which 200 were seated, followed inspection of the rooms. Mr. Blakeslee, president of the club, presided, and in the course of the evening elicited applause by reading the following telegrams:

Upon the auspicious occasion of the dedication of the new club rooms of the Machinery Club of Chicago, the Machinery Club of the City of New York wishes to extend cordial greetings of fellowship and good will, and to express the confident hope that your effort to contribute to the convenience and comfort of the men identified with the machinery interests of the great city of Chicago will win enduring and abounding success.

THE MACHINERY CLUB OF THE CITY OF NEW YORK,
HENRY PRENTISS, President.

The following reply was sent:

We, the members of the Machinery Club of Chicago, desire most sincerely to accept your very kind and courteous greetings. Please rest assured we appreciate the spirit expressed by the New York Machinery Club, from whose origination the foundation was laid for the Machinery Club of Chicago.

MACHINERY CLUB OF CHICAGO,
CLYDE W. BLAKESLEE, President.

David Ballard, an honorary member, who formerly represented the Jones & Lamson Machine Co. in the Chicago territory, went from Washington to attend the opening. Called upon by Mr. Blakeslee, he made a short but effective speech. By a standing vote, on a resolution offered by Herbert Nunn, Cleveland Automatic Machine Co., the members expressed their appreciation of the work done by the club's officers and committees. Mr. Blakeslee, in responding, said no city exceeds Chicago as a factor in the distribution of machine tools. For the club he asked unstinted support, saying that the members would benefit not only themselves but the city. He spoke of the many discouragements encountered in the work of organization, but persistency has won, and the roster of members totaled 522, with the club free of debt.

Recognition was given to several who had put forth unusual effort to make the club a success, and a most popular vote was that making Palme (Dad) Knudsen a life member in return for the service he had rendered. He is connected with L. S. Starrett & Co. The chief speaker was Henry R. Rathbone, a lawyer of Chicago, whose patriotic speech aroused enthusiasm. A telegram from W. H. Taylor was read, as follows:

As president of The Iron Age Publishing Co., I wish to extend congratulations and best wishes to the Machinery Club of Chicago.

The club has been presented a victrola by E. L. Essley, E. L. Essley Machinery Co., Chicago; a "grandfather" clock by Hoggson & Pettis Mfg. Co., New Haven, Conn., and a lamp by H. A. Stocker, Stocker-Rumely-Wachs Co., Chicago.

Norton A. Booz, Machinists' Supply Co., is secretary and F. Le Roy Peterson, Hendey Machine Co., chairman of the house committee.

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Working Out the Prices of Steel Products

Manufacturers Preparing a Schedule of Pig Iron and Finished Materials

Committees of Council of National Defense Have Dissolved and Now Act as Members of American Iron and Steel Institute—Many Trade Questions Present Difficulties That Will Be Overcome

Work is being pushed vigorously on the adjustment of prices on various grades of pig iron and various forms of semi-finished and finished steel products, in line with the announcement made last week at Washington of Government prices on iron ore, coke, pig iron, plates, shapes and bars. After the lists have been made, iron and steel manufacturers will confer again with the War Industries Board and it is expected that prices on the full list of products will be announced by the President next week.

An important development in the co-operation of manufacturers with the Government is that members of the various iron and steel and metal committees heretofore connected with the Council of National Defense are resigning and these committees will go out of existence. So far as iron and steel manufacturers are concerned, their future activities will be in the direction of gathering and supplying information and they will act as committees of the American Iron and Steel Institute.

Iron and steel manufacturers have been engaged in the past week in the compilation of data to be presented to the War Industries Board at Washington and to be made the basis of fixing prices on various iron and steel products not contained in the list promulgated on Monday, Sept. 24. The members of the steel committee were in conference in New York on Saturday, Sept. 29, and on Monday, Tuesday and Wednesday of this week. The pig iron committee met in New York on Tuesday and an adjourned session was held on Wednesday.

As stated above, the iron and steel manufacturers are no longer acting as subcommittees of the Council of National Defense. The question of compliance with section 3 of the Lever act has been gone over, and as indicated in another column Director Gifford of the Council of National Defense has called on the members of all committees to declare in writing their interest in various contracts for iron and steel recently made with the Government. In view of the complication of the machinery of such declarations and because of the question raised as to the compliance with the Sherman act, it was deemed best for the iron and steel manufacturers to resign from all connection with committees which were in any way under Government or Government advisory auspices. These manufacturers are now acting as committees of the American Iron and Steel Institute for the purpose of furnishing information to the War Industries Board, but have no connection, advisory or otherwise, with the awarding of any contracts.

Inquiries have been coming in the past week from users of steel in all parts of the country to large manufacturers, and the office of THE IRON AGE has had a plentiful share, consumers of steel showing a great desire to know whether purchases could be made at the new prices and also whether there would be steel available for general uses after the Government and the Allies had made their requisitions.

Contracts to Be Carried Out

It was definitely provided in the Lever act for the regulation of food and fuel markets that the fixing of prices by the Government should not affect contracts already in existence. This principle was fully recognized in the negotiations between iron and steel manufacturers and the War Industries Board at Washington on Sept. 20 and 21, and it was reiterated at the sessions of the two days that existing contracts should be carried out at the prices stipulated. The difficulties in the execution of this program are well known. In the Senate committee hearing on the Pomerene bill, as reported fully in THE IRON AGE last week, and as referred to further in our Washington correspondence elsewhere in

this issue, Government abrogation of existing contracts was seriously proposed, so that the industry might be rapidly adjusted to the reduced prices. It is questionable that Congress will consider such a revolutionary step with all the liabilities the Government would incur in attempting to abrogate contracts.

But it is to be said at the same time that there is strong pressure from various quarters to make the new prices the basis of values of ultimate products into which iron and steel enter. One of the arguments in this connection, as presented by Dr. Walker in the Senate committee hearing, and given in another column, is that a manufacturing user of steel products who was taking out material under an old and high-priced contract could not compete with a manufacturer not so bound who could go into the market and get steel at the new prices. One answer is that users of steel who are under contract are not paying much if any more for their material than the Government has agreed to pay under the new arrangement. Many of them have been only recently receiving shipments at less than these figures. Much of the misunderstanding at Washington on the price situation in steel is due to the mistaken idea that manufacturers of products into which iron and steel enter have been paying approximately the prices prevailing in the past six months for iron and steel for early delivery.

The New Prices and Public Buying

Some buyers of steel have been asking, as though they expected an answer offhand, how soon the mills would sell material for early delivery on the new basis. The answer is far from easy. In the first place, most steel manufacturers are sold ahead for a number of months—some manufacturers for six months on some products, though there are those in certain lines who have avoided long commitments and chosen rather to get the benefit of the higher prices on early deliveries. All sorts and conditions of order books exist, depending on the seller and the product. The Steel Corporation, as is well known, is committed far ahead, both to the Government and the public.

Priority Steel of Large Volume

But overtopping every consideration and making all calculation highly difficult, as to the supply of steel for manufacturing consumers, is the unknown factor of the Government's and the Allies' requirements in the next six months. It is known that in plates they will take substantially the output in ship and boiler quality, leaving for general consumption, including plates for cars and other railroad purposes, a comparatively small

amount. In structural shapes, when existing contracts and Government buying are subtracted, little will be left for the general market for a good many months. In bars, the public should not fare badly, but here shell needs will cut a large figure and general contract engagements will leave little for sale in early months at the new prices. Tin plate is well taken up on contracts that are strictly under Government oversight. In sheets, wire products and pipe, war needs are not a great factor relatively, but a factor to be considered is the amount of ingot steel that will be diverted from mills in these lines to satisfy the demand for shell forgings.

It is plain, with the war program carried out on the scale announced, and particularly with the stupendous demand for ship steel, that the execution of contracts now on the books of the steel manufacturers will leave no large amount of steel to be sold to the public in the next six months. But, as indicated above, that is not saying that manufacturing business will not receive a large amount of steel on their contracts in the next six months at prices averaging close to those already fixed by the Government.

Chicago and Pittsburgh Basing

In the list of prices of the six commodities announced by the President last week, the prices on plates, shapes and bars were given as for Chicago or Pittsburgh delivery. No arrangement for a common price for Chicago and Pittsburgh was agreed to by the manufacturers nor was the subject discussed, and it is not their intention to change from the long established practice of making Pittsburgh the basing point. How the dual basing came to be incorporated in the President's announcement has not been explained, but the matter has caused considerable comment in the trade.

Illinois Manufacturers Ask Information

Under date of Sept. 26, Samuel M. Hastings and John M. Glenn, president and secretary, respectively, of the Illinois Manufacturers' Association, Chicago, sent the following telegrams, one to Frank A. Scott, Chairman War Industries Board, and the other to Chairman E. H. Gary of the United States Steel Corporation:

"E. H. Gary, United States Steel Corporation, New York.

"How soon can the steel companies begin to supply your products in addition to the needs of the Government on basic prices established by the Government? Our manufacturers do not know how to make prices on their products to their customers for either immediate or future delivery. What is the attitude of the steel and iron producers going to be toward existing contracts for steel and iron which were placed at prices above those agreed upon by the steel producers and the Government?"

"Frank A. Scott, War Industries Board, Washington, D. C.

"Consumers are demanding immediate reduction in the prices of finished iron and steel products in proportion to Government basic prices. Members of the Illinois Manufacturers' Association claim they cannot get steel and iron from mills at the prices set by the Government for immediate delivery. What can be done to correct the general impression that the prices fixed will have the immediate effect of correspondingly reducing prices of all products made of steel and iron? Is it true the product of all the steel mills is contracted for six months ahead? Is it true that the Government demand for metals will consume these products by April 1, 1918? Did the Government in fixing the prices give any consideration to the manufacturers who produce goods made of steel and iron for domestic consumption? Has any decision been arrived at between the Government and the steel and iron producers in those cases where existing contracts for steel and pig iron are at higher prices than those agreed upon?"

What answers, if any, were received by the senders of the above telegrams THE IRON AGE is not informed. It is probably well within the bounds of truth to say that no man in the United States has the answers to all the questions the Illinois gentlemen have crowded into their telegrams. All that can be gathered from the developments of the past week indicates that the majority of the iron and steel men who were in Washington on Sept. 20 and 21 had no more conception than the Government's representatives had of the effect in detail of the price fixing on either the sellers or the buyers of steel. The procedure is so revolutionary and the interests affected so varied and so widely ramifying that no little time will be required for any exact appraisal of effects.

FIXED PRICES COMPARED

With Those of Four Years Before the War Demand Developed

The relation between the fixed prices announced at Washington on Sept. 24 and the average for the four years before the export demand growing out of the war forced the rapid advances is shown in the accompanying table. The averages, which are those of THE IRON AGE quotations, cover some products for which prices have not yet been fixed but will be of particular interest when the supplementary announcement is made.

Iron and Steel Prices for Years 1911 to 1914, inclusive.
Prices in Dollars per Gross Ton

	1911	1912	1913	1914	Ave. for Govt. 4 Years	Price
Mesaba ore, non-Bessemer	3.50	2.85	3.40	2.85	3.15	5.05
No. 2 X foundry pig iron, Philadelphia	15.21	16.03	16.54	14.73	15.63	33+
No. 2 foundry pig iron at Chicago furnace	14.83	15.32	15.85	13.60	14.90	33
No. 2 foundry pig iron, Cincinnati	13.67	14.93	14.90	13.41	14.23	....
Bessemer pig iron, Pittsburgh	15.71	15.94	17.12	14.89	15.92	36+
Basic pig iron, Valley furnace	13.07	13.92	14.71	12.87	13.64	33
Bessemer steel billets, Pittsburgh	21.42	22.39	25.79	20.08	22.42	....

Prices in Cents per Pound

Soft steel bars, Pittsburgh	1.26	1.29	1.55	1.15	1.31	2.90
Beams, Pittsburgh	1.32	1.32	1.50	1.15	1.32	3.00
Plates (tank), Pittsburgh	1.31	1.33	1.50	1.14	1.32	3.25
Wire nails, Pittsburgh	1.70	1.64	1.70	1.56	1.65	....
No. 28 black sheets, Pittsburgh	2.04	2.00	2.20	1.88	2.03	....
Tin plate, Pittsburgh	3.62	3.45	3.55	3.28	3.47	....

MAKERS AND WAR CONTRACTS

Director Gifford Calls for Filing of Declarations of Interest

WASHINGTON, Oct. 2.—The Council of National Defense has issued an order binding upon all members of its advisory or co-operative committees, outlining the course to be pursued by members in making recommendations for the awarding of contracts or the placing of orders for war material. The order, which is based upon the recently announced opinion of the Attorney General as to the proper construction of section 3 of the Lever food control law, is as follows:

The function of all advisory or co-operative committees of industry of the Council of National Defense is to advise and furnish information to the director of the Council of National Defense, the War Industries Board, or members thereof, when called upon to do so or upon the committee's own initiative, regarding industries in their relation to the war needs of the United States and the allied governments.

In view of section 3 of the food control law, of Aug. 10, 1917 (copy attached hereto), no advisory or co-operative committee, member, agent or employee thereof shall

(a) Solicit, induce or attempt to induce persons or officers authorized to execute or direct the execution of contracts on behalf of the United States to make any contract or give any order for the furnishing to the United States of work, labor,

(Continued on page 854)

Iron and Steel Markets

TO FIX ALL STEEL PRICES

Full Schedule Expected Next Week

Meanwhile Buying Is Practically Suspended— Export Prices Not Regulated

The steel trade has been given up wholly to a discussion, at times excited, of the terms and effects of the agreed prices on six products as announced from Washington, but as yet little light has been shed on the situation. Buying and selling are practically out of the question, and steel committees of manufacturers have been in daily session in New York this week working out prices on the full line of products in proper relation to those already fixed. Another conference at Washington will follow and next week the President will announce prices on the various grades of pig iron, on semi-finished steel and a long list of rolled products.

Many manufacturing users of steel have urgently asked when the new prices will be quoted to the public, whether contracts at higher prices will be readjusted, and what chance private business will have as the Government closes in upon the mills with an increasing volume of priority orders.

In all the confusion it is clear that the new prices will figure but little in general business for weeks. The decrees of the priority committee at Washington really control the industry and while Government demand centers on a few lines, that control affects the supply of steel available for other finished forms. On the question of contracts manufacturers quite uniformly answer that these are to be enforced in the same way as the Lever act provided for the carrying out of fuel contracts.

Foundry pig iron sales on the \$33 basis have been negligible. The largest reported is of 2000 tons of No. 3 iron at \$32 at eastern Pennsylvania furnace, this being in line with \$33 for No. 2 foundry. No new sales of Bessemer or basic iron were made, but the announced September averages of \$45.45 on Bessemer and \$41.34 on basic at Valley furnace indicate that sales at the new prices late in the month were enough to pull down the average materially.

Some producers of Southern iron expect to adhere to a \$33 Birmingham basis, in spite of a \$4 freight to the North, where the same price is to prevail, arguing that the supply of iron will not be equal to the demand.

The fact that only manufacturers have agreed to the new prices has brought up the question of the jobbers' margin and some regulation there is looked for. Already it has been decided at Washington that coke brokers may charge a commission above the \$6 price.

In finished material further large purchases have been made by the Government at the new prices, and the British Government's negotiations for 400,000 tons of shell steel are of special interest. The Washington Government has figured on an unheard-of scale in the machine tool market, and contracts just reported aggregate many millions.

That the established prices may not uniformly prevail is indicated by transactions in which unprecedented extras have been paid, particularly for plates. There is no provision, moreover, against sales of rejected war material as scrap at prices higher than the schedule.

A notable development of the week are the wholesale resignations of iron and steel manufacturers from committees of the Council of National Defense, because of questions again raised as to the legality of such service in view of Government contracts with steel companies. The manufacturers' committees now making up new price schedules are acting as committees of the American Iron and Steel Institute.

Pig iron production again fell off slightly, the September total being 3,133,954 tons for 30 days, or 104,465 tons a day, against 3,247,947 tons in August, or 104,772 tons a day. Poor coke and repeated banking for lack of fuel are causing the blowing out of more furnaces for relining, there being a net loss of ten furnaces last month. The estimated capacity of the 347 furnaces active Oct. 1 was 107,250 tons a day, against 110,165 tons a day for the 357 furnaces in blast one month previous.

While the new low prices for steel do not apply to export business apart from sales to the Allies the enforcement of export embargoes leaves the outlook for extra profit on foreign trade not particularly attractive.

Large rollings of steel plates on the Japanese contracts are being shipped to the Pacific Coast for storage, evidently in the expectation that the embargo is to be lifted, though there is no inkling of the outcome of diplomatic negotiations on this matter. There is little likelihood of any early relaxation of the export restrictions on tin plate.

On new projects some fabricators are figuring on the basis of the fixed price of 3 c. for the plain material, but there is the fear that mills will require authorization of the priorities committee before accepting orders.

The reported payment of \$140 a ton for fabricated material for Government shops to be erected in France, representing a spread of 4c. from the Government price on plain material, is considered significant. It is observed also that it is possible to get bids on fabricated material but not on plain material.

Pittsburgh

PITTSBURGH, Oct. 2 (By Wire).

A great many questions are being asked in the iron and steel market and very few are being answered. The agreement that was reached between the Government and the iron and steel producers ten days ago fixed merely a basis for prices, and there is a long list of commodities for which prices are eventually going to be worked out. A series of meetings of steel producers starts to-day, the object of which is to arrange a list of prices for wire products, tubular goods, sheets, etc., which will be in conformity to the prices originally agreed upon, 2.90c. for bars, 3c. for shapes and 3.25c. for plates. These prices will be submitted to the War Industries Board, and if approved by that body will be

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Oct. 2, 1917.	Sept. 26, 1917.	Sept. 5, 1917.	Oct. 4, 1916.
No. 2 X, Philadelphia...	\$33.75	\$33.00	\$53.00	\$19.75
No. 2, Valley furnace...	33.00	33.00	52.00	19.00
No. 2, Southern, Cin'ti...	...	...	49.90	17.40
No. 2, Birmingham, Ala.	...	...	47.00	14.50
No. 2, furnace, Chicago*	...	...	55.00	18.50
Basic, del'd. eastern Pa.	...	45.00	50.00	20.00
Basic, Valley furnace...	33.00	33.00	48.00	19.50
Bessemer, Pittsburgh...	37.25	37.25	51.95	23.45
Malleable Bess., Ch'go*	...	...	55.00	19.00
Gray forge, Pittsburgh...	...	...	46.95	19.95
L. S. charcoal, Chicago...	...	...	58.00	19.75

Rails, Billets, etc., Per Gross Ton:	Oct. 2, 1917.	Sept. 26, 1917.	Sept. 5, 1917.	Oct. 4, 1916.
Bess. rails, heavy, at mill	38.00	38.00	33.00	
O.-h. rails, heavy, at mill	40.00	40.00	35.00	
Bess. billets, Pittsburgh...	60.00	75.00	45.00	
O.-h. billets, Pittsburgh...	60.00	75.00	45.00	
O.-h. sheet bars, P'gh...	70.00	80.00	45.00	
Forging billets, base, P'gh	90.00	100.00	69.00	
O.-h. billets, Phila...	70.00	90.00	48.00	
Wire rods, Pittsburgh...	85.00	90.00	55.00	

Finished Iron and Steel,

Per Lb. to Large Buyers: Cents.	Cents.	Cents.	Cents.
Iron bars, Philadelphia...	4.935	5.185	2.659
Iron bars, Pittsburgh...	4.75	4.75	2.60
Iron bars, Chicago...	4.50	4.50	2.35
Steel bars, Pittsburgh...	4.00	4.00	2.75
Steel bars, New York...	4.195	4.195	2.919
Tank plates, Pittsburgh...	8.00	8.00	4.00
Tank plates, New York...	8.195	8.945	4.169
Beams, etc., Pittsburgh...	4.00	4.00	2.75
Beams, etc., New York...	4.445	4.445	2.869
Steel hoops, Pittsburgh...	5.75	5.75	3.00

*The average switching charge for delivery to four tries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers: Cents.	Oct. 3, 1917.	Sept. 26, 1917.	Sept. 5, 1917.	Oct. 4, 1916.
Sheets, black, No. 28, P'gh	8.50	8.50	3.10	
Sheets, galv., No. 28, P'gh	9.50	10.00	4.25	
Wire nails, Pittsburgh...	4.00	4.00	2.60	
Cut nails, Pittsburgh...	4.65	4.65	2.60	
Fence wire, base, P'gh...	3.95	3.95	2.55	
Barb wire, galv., P'gh...	4.85	4.85	3.45	

Old Materials, Per Gross Ton:

Iron rails, Chicago...	\$36.00	\$40.00	\$44.50	\$19.25
Iron rails, Philadelphia...	43.00	43.00	45.00	20.00
Carwheels, Chicago...	24.00	30.00	31.50	11.75
Carwheels, Philadelphia...	29.00	32.00	34.00	15.50
Heavy steel scrap, P'gh...	33.00	33.00	34.00	17.50
Heavy steel scrap, Phila...	25.00	30.00	31.00	15.00
Heavy steel scrap, Ch'go...	27.00	30.00	31.00	16.25
No. 1 cast, Pittsburgh...	30.00	30.00	30.00	15.00
No. 1 cast, Philadelphia...	28.00	30.00	32.00	16.00
No. 1 cast, Ch'go (net ton)	21.00	23.00	24.00	12.50
No. 1 RR. wrot, Phila...	43.00	43.00	45.00	20.00
No. 1 RR. wrot, Ch'go (net)	30.00	34.00	36.00	16.75

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt...	\$6.00	\$6.00	\$13.50	\$3.25
Furnace coke, future...	6.00	6.00	10.00	3.00
Foundry coke, prompt...	...	...	14.50	3.25
Foundry coke, future...	...	...	12.50	3.75

Metals,

Per Lb. to Large Buyers: Cents.	Cents.	Cents.	Cents.
Lake copper, New York...	23.50	23.50	25.25
Electrolytic copper, N. Y.	23.50	23.50	25.25
Spelter, St. Louis...	8.12½	8.25	8.00
Spelter, New York...	8.37½	8.50	8.25
Lead, St. Louis...	7.82½	7.82½	10.12½
Lead, New York...	7.95	7.95	10.25
Tin, New York...	60.50	62.00	61.00
Antimony (Asiatic), N. Y.	15.00	15.00	14.50
Tin plate, 100-lb. box, P'gh	...	\$12.00	\$12.00

announced to the public. Very little business has been done in the pig iron, unfinished steel and finished steel markets in the past week, but this condition involved little change in the volume of business because the market had been extremely quiet before the price fixing began. In bars, shapes and plates there has been practically no business done. There has been considerable inquiry, but, as the mills are well sold up, they have refused to quote. In the products for which prices have not yet been fixed there has been some business done, but on the whole not nearly as much as formerly. The National Tube Co. has booked business in the past week in about the same volume as formerly, but its prices are far below the open market and its sales are made to regular customers only. In sheets, the market has become practically stagnant, as buyers expect to get their material eventually at much lower prices. Some important questions are being raised as to what principles should govern the holders of material who are not producers. Several middle interests in pig iron have expressed the opinion that they should not sell at above the agreed maximum prices, although they were not parties to the agreement. In the case of coal and coke, prices for which are fixed under the Lever Act, rather than by mutual agreement, it seems to be obligatory upon brokers or merchants not to sell at above the prices prescribed by the Government, although in some official circles in Washington the opinion has been expressed that in the case of material purchased before the price was fixed the holder is entitled to sell at a profit. The condition of market prices being fixed by the Government is so altogether novel both buyers and sellers feel themselves quite in the dark as to the course trade will pursue, but it seems to be the common opinion thus far that there will be little trading until the major part of the business now on the books of producers has been worked off, exception being made, of course, on orders that are placed by the Government or by those who are making various wares for the Government. Buying of this sort promises to be heavier

than ever in the near weeks, as orders for the Government's allies can be placed freely, now that the matter of prices upon such orders is settled. Production of pig iron and of steel are at about the same rate as formerly. While production usually increases at this time of the year on account of favorable weather, the production now is altogether a matter of coke supply, which has been about the same in the past week as for several weeks past. While there has been very little coke offered in the open market since the Government fixed the price, the operators have been shipping fully on their contracts, as well as on sales for short delivery periods made just before the price was fixed, and open market offerings are expected later to become more plentiful.

Pig Iron.—In the absence of actual sales, and while pending adjustments of differentials for special grades are still under discussion, it is hard to determine the market on anything aside from basic, No. 2 foundry, and the agreed price on Bessemer. The only inquiry noted this week is on No. 2 foundry for last quarter on which a local interest wants 3000 tons. A Cleveland inquiry for 1000 tons of malleable for October and November delivery is still out. One consumer has offered \$33 at the furnace for gray forge iron, but on advice has not closed. Furnaces are keeping in mind the preferred classes, and are giving strict attention to credit considerations, since the Government has set its price. It has been suggested to the price-fixing committee that in establishing the new differentials, the open market price over the past eight months or a year be taken as a basis, and the average percentage over the price of basic iron be taken as the differential over the Government price of \$33 at the furnace on special grades, such as gray forge, malleable, low phosphorus and silvery. The \$36.30 price made last week on Bessemer has not been received with general satisfaction. The average prices for September as announced by W. P. Snyder & Co. were \$45.4506 on Bessemer and \$41.344 on basic, both at Valley furnaces.

We quote standard Bessemer iron at \$36.30, basic \$33, No. 2 foundry \$33, all at Valley furnace, the freight rate to Cleveland or Pittsburgh districts being 95c. per ton, and omit quotations on forge, malleable and low phosphorus in the absence of action by the price-fixing committee.

Billets and Sheet Bars.—Aside from a single sale of 1000 tons of 4 x 4 in. soft open-hearth billets at \$60, Pittsburgh, no actual sales have been reported, although there has been considerable inquiry in an effort to further feel out the market. This inquiry includes a considerable tonnage of plate mill slabs and some sheet bars, but there has been no inclination to close until after further information has been received in regard to Government price fixing. The committee is expected to make its recommendations within the next week, and establish the differential on ingots, billets, sheet bars and slabs. In the absence of definite prices, we continue to quote soft Bessemer and open-hearth billets at \$60 or less, and sheet bars at \$70 or less, maker's mill, Pittsburgh. Forging billets are nominally quoted at \$90. A local interest is reported to be in the market for about 5000 tons of grooved skelp.

Ferroalloys.—The unsettled condition of the general market is also reflected in the various ferroalloys and aside from a reported sale of 25,000 tons of ferrosilicon to the Carnegie Steel Co., by Electro Metallurgical Co. of Niagara Falls, N. Y., for all of 1918, no further transactions have been reported. On 80 per cent domestic ferromanganese for prompt delivery, we quote \$375, and on future contract \$350 to \$375. We quote 18 to 22 per cent spiegeleisen at \$80 to \$82.50 per gross ton delivered, and pending adjustments repeat our former quotations on ferrosilicon and the silveries.

We quote 9 per cent Bessemer ferrosilicon at \$89, 10 per cent \$90, 11 per cent \$95, 12 per cent \$100, 13 per cent \$105, 14 per cent \$115, 15 per cent \$125, and 16 per cent \$135. We now quote 7 per cent silvery iron at \$79 to \$84, 8 per cent \$80 to \$85, 9 per cent \$81 to \$86, 10 per cent \$82 to \$87, 11 and 12 per cent \$83 to \$88. All f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, and Ashland, Ky., these furnaces having a uniform freight rate of \$2 per gross ton for delivery in the Pittsburgh district.

Steel Rails.—Readjustment of rail prices is looked for with the new recommendations of the American Iron and Steel Institute committee, and pending this announcement no rail activities are expected. Nominal prices on light rails and regular prices on standard sections are given in detail on page 845.

Structural Material.—The new prices on shapes and angles have not resulted in the mills taking on additional business. The facts are mills are not booking any tonnage aside from the Government requirements, and their specified obligations are steadily going down. The leading fabricating interests report not having taken on any business during the past week, and while several tentative inquiries as to whether new orders would secure material are out, no new business, as far as we can learn, has been done at the Government price.

Plates.—The vast majority of plate mill tonnage on the books is subject to Government direction and the priority board has been asked to decide the sequence in which the requirements of the Army, Navy and Shipping Board are to be filled. Because of conflicting demands from the various branches of the service, there has been a great deal of confusion and some delay, and local mills have been informed that the shipbuilding and naval program tonnage so far ordered has by no means predicated the immense tonnage that will actually be placed, and indications are that Class A and Class B requirements will take practically the entire plate capacity for a long time ahead. There are no new car inquiries, but a local interest has asked for early deliveries on plate for a large number of 55,000-gallon oil tanks to be shipped abroad, knocked down, for the Allies. In view of the fact that any new orders placed must be at the Government's price, we quote sheared plates ¼ in. and heavier at 3.25c. at mill.

Sheets.—Consumers have shown no inclination to buy prior to the Government fixing the new sheet price. The inquiry has been light, and mills have not taken on any new business for next year. We repeat former prices on sheets, which are purely nominal, on page 845.

Tin Plate.—The double uncertainty as to the price of sheet bars and contemplated Government action has further delayed opening the books for first half of 1919 and until something more definite can be learned on these points the trade is simply marking time, and we continue to quote nominal prices of \$12 to \$14 per base box, Pittsburgh, on primes. Prices on terne plate are given on page 845.

Hoops and Bands.—With a certainty of lower prices in the near future there has been practically no new inquiry, and inasmuch as consumers are covered over the remainder of this year, and some through the first quarter of next, there is no incentive for action at this time.

Shafting.—Government demands are coming in to shafting makers in increasing volume, and indications point to a still heavier demand from the outside as soon as the Government price has been placed on this material. Indication of greater strength is shown by a stiffening in price pending Government regulation. For the domestic trade discounts on shafting range from 10 to 5 per cent off list, although sales to the Government have been made at a much lower figure.

Railroad Spikes and Track Bolts.—This market is very quiet and awaiting readjustment in prices. Nominal prices on railroad spikes and track bolts are given in detail on page 845.

Nuts and Bolts.—The leading maker has made an adjustment in prices on hot pressed square and hexagon nuts in an effort to adjust prices on the same plane with bolts, and reports a decided improvement in both ship material and requirements of the general trade over the past ten days. This branch of the trade reports that inasmuch as it has not yet received the benefit of reductions on its raw materials, there is nothing in the situation to warrant reduction in the selling prices. Discounts in effect are given on page 845.

Wrought Pipe.—The Government demand is unusually heavy and is getting the preference in every direction. Unusually big specifications have been received on both merchant pipe and boiler tubes for emergency fleet work, and distribution is being taken care of by the tubular goods committee. The leading interest is booked ahead for practically 70 weeks.

Boiler Tubes.—There are no regular prices on either iron or steel tubes, mills being sold up for over a year, although odd lots have been out in the open market at heavy premium prices from time to time. Nominal discounts, which are very much below actual prices ruling but are shown pending Government prices, are given on page 845.

Old Material.—The scrap market is unsettled and unsteady, and while there have been no actual transactions to test it, there are evidences of weak spots in several directions, and both consumers and dealers are anxiously awaiting the action of the price fixing committee in regard to old material. Practically none is being offered and under present conditions we repeat our former nominal quotations.

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	\$33.00 to \$34.00*
No. 1 foundry cast	30.00 to 31.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin Pa.	38.00 to 40.00
Hydraulic compressed sheet scrap	25.00 to 26.00
Bundled sheet scrap, s'des and ends, f.o.b. consumers' mill, Pittsburgh district	23.00 to 24.00
Bundled sheet stamping scrap	21.00 to 22.00
No. 1 railroad malleable stock	26.00 to 27.00
Railroad grate bars	18.00 to 19.00
Low phosphorus melting stock	42.00 to 45.00
Iron car axles	45.00 to 46.00
Steel car axles	45.00 to 46.00
Locomotive axles, steel	52.00 to 53.00
No. 1 busheling scrap	24.00 to 25.00
Machine-shop turnings	21.00 to 22.00
Cast iron wheels	31.00 to 32.00
Roller steel wheels	36.00 to 37.00
*Sheet bar crop ends	41.00 to 42.00
Cast iron borings	22.00 to 23.00
No. 1 railroad wrought scrap	32.00 to 33.00
Heavy steel axle turnings	23.00 to 24.00
Heavy breakable cast scrap	24.00 to 25.00

*Shipping point.

Coke.—While the Government price of \$6 has been generally accepted and a few transactions have been reported on this basis, several complications have arisen which have delayed a real try-out of the market. Chief among these was the position taken by middlemen, who questioned their right to charge a commission above the \$6 rate for handling this business, but a committee went to Washington, consulted Dr. Garfield, and reports that a reasonable commission will be allowed. Ovens are shipping heavily on contracts, but it is thought a larger tonnage of spot coke will come out within the next month than has been shown since the price was fixed. Many of the new contracts do not start before Jan. 1. During the past few months there has been considerable open tonnage on which the ovens have been selling at the prevailing high prices, and while it is undoubtedly true that some of this was closed in anticipation of Government price fixing, there are still some fair tonnages that are not under contracts. For the week ending Sept. 22, the Connellsville *Courier* gives the output of the two Connellsville regions as 355,102 tons, an increase over the previous week of 5427 tons. We quote the Government price of \$6 per net ton at oven on all grades of blast furnace and foundry coke for spot shipment and on contracts.

Chicago

CHICAGO, Oct. 1.

The iron and steel trade is calmer to-day than it was a week ago immediately following the announcement of prices for a few basic products, but when one seeks information, the muddle caused by the news seems to be but little changed. The mills are not quoting on plates, shapes and bars, but these and other steel products probably can be obtained, at the so-called government prices, where they exist, provided priority certificates are held by the buyers. Some doubt is expressed as to how the priority feature can be intelligently worked out in view of the complexities of the situation, and the fact that war requirements are far-reaching. Interest attaches to the question whether the new steel prices will apply to export orders apart from those from the Allies, plates being excepted because of the embargo on their export. An authority expresses the opinion that the new and low prices are not for the private buyer in the allied countries, although the allied governments may benefit from them. He holds further that none of the few neutral countries are to be benefited. The Japanese are more eager than ever for plates, and willing to pay almost any price for them. Jobbers take the stand that their obligations to the mills must be filled before they can give the public the benefit of lower prices. Like so many consumers, they, too, are contractors for material, and it is generally held that not only must contracts be adhered to, but that the Government itself must insist upon their fulfillment. A sale of two carloads of Southern foundry iron to a Rockford, Ill., buyer has been made at \$33, Birmingham, a qualifying fact being that the seller had failed in the delivery of other iron. It is not ascertained that any other sale has been made, at any price, both Northern and Southern producers asserting they have none to sell. One large Southern producer has no fault to find with the price, and other makers are not complaining, except in regard to the failure of production to equal previous estimates, causing them to be behind in deliveries, therefore unable to handle new orders. The basis for charcoal iron is expected to be about \$35.50, f.o.b. furnace. The old material market is at sea. The mills are not interested in buying, and the price table is based on opinion, rather than on transactions. Only a renewal of activity can readjust price levels in a satisfactory way. That the old quotations are shattered is agreed on all sides. Three carloads of coke were placed in this vicinity at \$6, plus 50c. for handling.

Pig Iron.—It is admitted by important sellers that if any Northern No. 2 foundry were available for shipment to the several melters who want prompt iron, no price higher than \$33 furnace would be obtained. But

not only do the iron firms say they have no iron that is not under contract, but they point to the extent to which furnaces are failing to meet former estimates of production. No longer is resale iron offered to any noticeable degree, and no furnace would undertake to supply a melter unless the Government specifically indicated that his requirements should be cared for. Such a one would get his iron, and get it at \$33, but it would be taken from some other purchaser, thereby delaying further the fulfilment of a contract. The principal producer in the South continues to report it has no iron to sell, all of its product being absorbed by its contract obligations; therefore it has no price. Another large Southern producer is on record as saying that the "Government" price of \$33 is satisfactory, but it is not taking new business because it is behind in its deliveries, and for this reason declines to quote. A large part of the Southern iron under contract was booked at prices from \$32, Birmingham, upward. The only reported business, since the Government price announcement, wherein \$33 figured as the price, involved two carloads of Southern iron placed with a Rockford, Ill., foundry on the basis of \$33, Birmingham, equal to \$37, Chicago, but it is said that this transaction was qualified by the fact that the seller owed other iron on which he could not make delivery, and was endeavoring to retrieve himself. Incidentally it may be said that a few second-hands are willing to let their holdings go at figures over the official price, but dealers are fearful at handling this iron. The question of contracts is uppermost in the minds of sellers, despite that part of the announcement of last week which said that contracts would be unaffected. It is argued that the Government itself must support contracts or producers will not have the wherewithal to pay the impending war taxes. On the other hand, they are being questioned as to the inviolability of contracts, not only those for iron but for castings. In regard to the latter it is pointed out that for some time to come iron which was bought on contract and at prices exceeding that recently fixed will be going into castings, and it is unfair to propose that the price of the latter be predicated on \$33 iron when none of the latter can be had and contracts must be carried out. Meanwhile there is a good inquiry for foundry iron in quantities from 200 to 1000 tons, all for prompt shipment. The silveries are much wanted, but the Ohio makers are not quoting. With regard to grades other than foundry, all now hinges on the forthcoming fixing of differentials by the official pig-iron committee. Following is the statement of a producer of charcoal iron:

In the first place, we have only a very small tonnage of iron which we can sell and deliver prior to July 1 next. This tonnage we will sell at the price agreed to between representatives of the furnace interests and a committee representing the Government at a conference in Washington, D. C., last week, in conjunction with a pig-iron committee which was created for the purpose of arranging a schedule of prices for low phosphorus and other special irons, using as a basis the price of \$33 for No. 2 foundry. As to just what these differentials will be, I have no definite or reliable data, except that in the case of charcoal pig iron, it has been suggested that it should command an advance of \$2.50 a ton over No. 2 foundry, or \$35.50, furnace. This price probably would cover grades 1 to 4 inclusive. The Scotch and lower silicon grades would probably be fixed at a somewhat higher price. We have heretofore been holding these latter grades at \$2.50 per ton above the normal grades. If this differential should continue, the price for Scotch and No. 6 grades would be \$38 per ton, f.o.b. furnace.

Another maker of charcoal iron stated: "One fundamental fact which sticks out above all others is that Uncle Sam has a big job on his hands, and it is up to all of us to pitch in and help him out."

A Western maker of low phosphorus is holding all inquiries in abeyance pending the fixing of differentials. The difficulty of giving prices which will justly and adequately serve all interests is evident. There can be no question about the prices of two weeks ago having been abandoned—the question is what prices have taken their place? Theoretically, the price for Northern No. 2, high-phosphorus, basic and malleable Bessemer is \$33, furnace. Actually, the conditions already referred to stand in the way of business being done at this level, at least for the time being. Therefore all prices in the fol-

lowing table are nominal, some because of inactivity, others because they have been left behind. For the grades named above, \$54, furnace, is no longer the quotation. The quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, Nos. 1 to 4.....	\$58.00
Lake Superior charcoal, Nos. 5 and 6, Scotch and No. 1 soft or special.....	\$60.50
Northern coke foundry, No. 1.....	\$33.50
Northern coke foundry, No. 2.....	\$33.00
Northern coke foundry, No. 3.....	\$32.50
Northern high-phosphorus foundry.....	\$33.00
Southern coke No. 1 f'dry and 1 soft.....	\$55.00
Southern coke No. 2 f'dry and 2 soft.....	\$52.00
Malleable Bessemer.....	\$33.00
Basic.....	\$33.00
Low-phosphorus.....	\$85.00 to 90.00
Silvery, 8 per cent.....	\$77.50 to 82.50

*Fixed by agreement, but nominal.

†Not yet changed, but new prices pending.

Ferroalloys.—For ferrosilicon, the quotation is about \$3.60 per unit, up or down. Fifty per cent is almost impossible to procure. Blast-furnace ferrosilicon is in active demand. The quotations for 80 per cent ferromanganese range from \$375 for the last half to \$350 for the first half, but these prices presumably will be revised at Washington.

Plates.—All prices made by the mills have been withdrawn. It is possible that a limited amount of plates might be secured at the Government price of 3.25c., Chicago, by a private buyer, but to get them he would be obliged to present a priority certificate showing that he had the backing of the Government. Japanese interests are willing to pay almost any price to insure getting plates, but, of course, both the priority rule and the embargo stand in the way. Large jobbers have not changed their quotations and do not expect to do so until they have discharged their obligations to the mills from whom they purchased. Meanwhile they are being asked right and left for material at the prices announced a week ago, their customers, however, usually being tractable when explanations are made. The warehouses cannot sell for less than they paid.

For Chicago delivery out of stock jobbers quote 10c.

Structural Material.—An influential architect, having in mind the sold-up condition of the mills and the diversion of steel to uses other than building, expresses the opinion that it will be some time before the public receives the benefit of the official price of 3c., Chicago, for shapes. The leading makers are not quoting, and if they did supply shapes, it would be virtually at the direction of the Government. The only letting announced this week involves 218 tons given to the American Bridge Co. for a school at Virginia, Minn. Jobbers, for reasons already stated, quote unchanged prices.

For material out of warehouse the quotation is 5c.

Bolts and Nuts.—Buyers continue to wait. No business has been done in the past week, but orders are accumulating and a rush of buying is sure to ensue as soon as the price atmosphere clears. For prices and freight rates see finished iron and steel f.o.b. Pittsburgh, page 845.

Cast Iron Pipe.—St. Louis has placed 1000 tons with the American Cast Iron Pipe Co. Wauwatosa, Wis., has placed 100 tons with a contractor. Minneapolis is about to place 150 tons, and St. Cloud, Minn., will place 275 tons Oct. 4. Prices are unchanged.

Quotations per net ton, Chicago, are as follows: Water pipe, 4 in., \$68.50; 6 in. and larger, \$65.50, with \$1 extra for class A water pipe and gas pipe.

Sheets.—Given priority certificates, sheets are obtainable, the quotations ranging from 8.189c. to 8.689c., Chicago, for No. 10 blue annealed; 8.189c. to 9.189c. for No. 28 black, and 9.689c. to 10.189c. for No. 28 galvanized, all of these prices being soft. Jobbers' quotations are unchanged.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 10c.; No. 28 black, 10c., and No. 28 galvanized, 11.50c.

Bars.—The leading makers of steel bars are not quoting. A prominent maker of bar iron and rail carbon bars has not sold a pound in the past week, but holds to the quotations of a week ago, and is marking

time pending some Government action on its product. It will insist that its contracts will be carried through as written, although consumers already have asked modifications. It asserts that it cannot profitably sell iron bars at 2.90c., Chicago, the official quotation for mild steel bars, pointing out the cost of handling, relative slowness and smaller volume of production, cost of labor, material, etc. As to rail carbon bars, a great deal depends on the price at which rerolling rails settle. Meanwhile the producer referred to, and others, adhere to the nominal quotations of 4.50c., Chicago, for iron bars and 4.25c. to 4.50c. for rail carbon.

We quote prices for Chicago delivery as follows: Soft steel bars, 4.50c.; bar iron, 4.50c. to 5c.; reinforcing bars, 4.50c. base, with 5c. extra for twisting in sizes $\frac{1}{2}$ in. and over and usual card extras for smaller sizes; shafting list plus 5 per cent to plus 10 per cent.

Old Material.—In a few instances dealers have bought material to fill old contracts, but this trading has been insignificant. The mills are not buying, and there is really nothing on which prices can be predicated save the statements of dealers as to what they believe scrap to be worth. Figures so obtained are given in the table below, and with them the assertion is made that despite the radical reductions recorded, no mill will pay them at the present juncture. The prices given are used because they are the best obtainable—the old quotations have been completely discarded. The general opinion is that the Government will not attempt to fix the prices of scrap, but that these will be left to work out their own salvation when ultimate finished material prices are known. The Northwestern, Great Northern and Pennsylvania Lines West are offering lists which will close this week, but the prices obtained will not make the market, though they may afford some indication. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails.....	\$36.00 to \$37.00
Relaying rails.....	50.00 to 55.00
Old carwheels.....	24.00 to 25.00
Old steel rails, rerolling.....	36.00 to 37.00
Old steel rails, less than 3 ft.....	29.00 to 30.00
Heavy melting steel scrap.....	27.00 to 28.00
Frogs, switches and guards, cut apart.....	27.00 to 28.00
Shoveling steel.....	24.00 to 25.00
Steel axle turnings.....	17.00 to 18.00

Per Net Ton	
Iron angles and splice bars.....	\$34.00 to \$35.00
Iron arch bars and transoms.....	38.00 to 39.00
Steel angle bars.....	24.00 to 25.00
Iron car axles.....	40.00 to 41.00
Steel car axles.....	40.00 to 41.00
No. 1 railroad wrought.....	30.00 to 31.00
No. 2 railroad wrought.....	27.00 to 28.00
Cut forge.....	27.00 to 28.00
Pipes and flues.....	19.00 to 20.00
No. 1 busheling.....	21.00 to 22.00
No. 2 busheling.....	15.00 to 15.50
Steel knuckles and couplers.....	31.00 to 32.00
Steel springs.....	31.00 to 32.00
No. 1 boilers, cut to sheets and rings.....	18.00 to 19.00
Boiler punching.....	30.00 to 31.00
Locomotive tires, smooth.....	34.00 to 35.00
Machine-shop turnings.....	15.00 to 16.00
Cast borings.....	14.00 to 15.00
No. 1 cast scrap.....	21.00 to 22.00
Stove plate and light cast scrap.....	18.00 to 18.50
Grate bars.....	15.00 to 16.00
Brake shoes.....	15.00 to 16.00
Railroad malleable.....	26.00 to 27.00
Agricultural malleable.....	22.00 to 23.00
Country mixed scrap.....	16.00 to 17.00

Wire Products.—Prices are unchanged, the leading interest quoting on the basis of \$3.20, Pittsburgh, for nails, the independents asking \$4. As a result of the price announcement of last week, many uninformed consumers have asked to be supplied at lower than the quoted prices, but without the desired result. We quote on the basis of \$4 for nails per 100 lb. to jobbers.

Plain fence wire, Nos. 6 to 9, base, \$4.189; wire nails, \$4.189; painted barb wire, \$4.339; galvanized barb wire, \$5.039; polished staples, \$4.339; galvanized staples, \$5.039; all Chicago, carload lots.

Rails and Track Supplies.—Deliveries of standard section rails are in some instances four months in arrears, a consequence of the Government demand for steel, and it is feared that some of the railroads will find themselves in a tight place for repair material this winter. No price changes are reported. We quote:

Standard railroad spikes, 4.50c. to 5.25c. base; small spikes, 4.75c. to 5.50c. base; track bolts with square nuts, 5.50c. to 6c., all in carloads, Chicago; tie plates, \$70 to \$90 f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 33 $\frac{1}{2}$ lb. (nominal); open hearth, \$40 (nominal); light rails, 25 to 45 lb., \$70; 16 to 20 lb., \$71; 12 lb., \$72; 8 lb., \$73; angle bars, 3.25c. base.

Cleveland

CLEVELAND, Oct. 2.

Iron Ore.—A strike of 10,000 seamen on the Lakes Oct. 1 was averted by the action of the Lake Carriers' Association, the Lake Seamen's Union and affiliated organizations in accepting a compromise agreement drawn by the United States Shipping Board. The Lake Seamen got only one of their six demands, and that for an increase in wages from \$72 to \$95 a month for able seamen and from \$57.50 to \$60 for deckhands for the months of October and November. Vessel men were firm in refusing to recognize the seamen's union and nothing of the kind was contained in the compromise agreement. The new wage scale is the highest ever paid. While some doubt has been expressed it is generally understood that the base price of ore named in the price agreement will apply to the 1918 sales, but subject to modification should the vessel rate for ore be changed. Mining companies have advanced wages of miners 10 per cent following the recent advance of the Steel Corporation. Many of these advances went into effect Oct. 1. Iron ore shipments fell off somewhat in September, the Lake movement amounting to 9,536,549 gross tons as compared with 10,146,786 in August and 9,600,786 tons in September, 1916. The total movement to Oct. 1 was 46,060,103 as compared with 48,816,650 tons for the corresponding period a year ago. We quote prices as follows, delivered lower Lake ports: Old range Bessemer, \$5.95; Mesaba Bessemer, \$5.70; old range non-Bessemer, \$5.20; Mesaba non-Bessemer, \$5.05.

Pig Iron.—Producers have accepted the \$33 price agreed upon by the Government and leading steel producers for basic and foundry iron, and announce that quotations will be on that basis. Various questions are still in the balance and until these are cleared makers are declining to quote prices. As far as can be learned, there has not been a quotation made on any grade of iron by any of the furnaces or selling agencies in the Cleveland territory since the price adjustment. Sellers are in doubt as to whether there is to be any differential between the Valley price and Lake furnace price and what is to be the differential between the different grades and what is to be the price of Southern iron. The price fixing has stimulated inquiry, mostly in lots of 500 tons and under. This is apparently coming from consumers who have been holding off waiting for price regulation, and is for iron both for the last quarter and first half. The possibility of a price change on Jan. 1 is a factor and sellers may not make quotations for next year's delivery for some time. Producers feel there is nothing to lose by not naming prices for a few days and some will decline to sell any more basic iron for this year's delivery, expecting Government orders for all they have left to supply steel plants making Government material. The Westinghouse Electric & Mfg. Co. is inquiring for 1000 tons of malleable iron for its Cleveland plant for this year's delivery and an inquiry from the Pittsburgh district is pending for 2000 to 3000 tons of No. 2 and No. 3 foundry iron for the last and first quarters. A Cleveland selling agency yesterday sold 400 tons of prompt shipment southern Ohio iron in this territory, the buyers to pay the price to be established for this grade, probably \$33, furnace. We quote, delivered, Cleveland, as follows:

Bessemer	\$37.25
Basic	33.30
Northern No. 2 foundry	33.30
Ohio silvery, 8 per cent silicon, nominal	81.62
Standard low phos. Valley furnace	30.00

Coke.—Most producers are sold up and have withdrawn from the market. There is some inquiry for foundry coke both for prompt shipment and contracts. We quote standard furnace Connellsville coke at \$6 per net ton at oven.

Finished Iron and Steel.—The two features of the market in which buyers have shown the greatest interest since the fixing of prices are whether they will be able to secure a readjustment of old contracts and increasing anxiety about getting deliveries on material

already bought. The delivery situation is getting worse every day because of the increasing demand of the Government. Mills are apparently taking a very firm stand against any revision of contract prices and in reply to numerous inquiries from the trade are advising that all the old contracts will stand. Leading mills are declining to quote prices as they expect the Government will require any additional tonnage they may have available, and buyers realize that it is likely to be a long time before they will be able to secure any steel at the Government prices. Some of the smaller plate mills are not adhering to the 3.25c. Government price. One Cleveland mill that has slabs under contract at high prices is quoting plates at 7.50c., Pittsburgh, and made several small lot sales at that price in the week. The same mill is quoting light plates at 6.50c. for No. 10. Another Cleveland plate mill has made no quotations since the new prices were named. Another plate mill has quoted the Government price with a \$85 a ton extra instead of the \$2 a ton extra for the material inquired for, and another has quoted the Government price with a 7.50c. extra for quick shipment. Some inquiries for sheet bars have come out, but are regarded as market feelers in view of the fact that prices on some finished steel have not yet been adjusted. Quotations of \$75 on sheet bars and \$112 on forging billets have been named. A sale of light rails is reported at \$80. Mills are quoting hard steel bars for reinforcing work at 4c., but buyers have been quoted a slightly lower price for material out of stock. The bar iron market is firm, with 4.50c. the usual quotation. Sheet prices which have not been readjusted as yet have eased off and small lot sales are reported at 8c. for No. 28 black and No. 10 blue annealed and 10c. for No. 28 galvanized. Most consumers are waiting for the announcement of the new sheet prices. Warehouse prices on sheets have declined \$10 per ton, black and blue annealed now being quoted at 8.50c., and galvanized at 10c. No change has been made in other prices. Bars are quoted out of stock at 4.50c. to 5c. and structural material at 5c. to 5.25c.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is light as consumers are holding off, awaiting an expected price adjustment. Recent prices are being maintained. Makers say that because of the priority orders of the Government they will be unable to get steel for a long time at prices lower than their present contracts, and that if bolt and nut prices are reduced the Government must make arrangements with the mills so that bolt and nut works can get lower priced steel. Rivet manufacturers are about in the same position in respect to getting their raw material and have received notices from the mills of a curtailment in rollings because of the increasing demands of the Government. Recent prices are being maintained and some business is being booked in small lots. Some contract business is also being placed for the fourth quarter. We quote rivets at 5.25c., Pittsburgh, for structural, and 5.35c. for boiler rivets. Bolt and nut discounts are as follows, round lot buyers being allowed 5 to 10 per cent discount:

Common carriage bolts, $\frac{1}{2}$ x 6 in., smaller or shorter, rolled thread, 35 off; cut thread, 30 and 5, larger or longer, 20. Machine bolts, with h. p. nuts, $\frac{1}{2}$ x 4 in., smaller or shorter, rolled thread, 40; cut thread, 35; larger and longer, 25. Lag bolts, cone point, 40. Square h. p. nuts, blank, \$1.90 off list; tapped, \$1.70 off list. Hexagon, h. p. nuts, blank, \$1.70 off; tapped, \$1.50 off. C. p. c. and t. hexagon nuts, all sizes, blank, \$1.25 off; tapped, \$1 off. Cold pressed semi-finished hexagon nuts, 50 and 5 off.

Old Material.—The expected drop in scrap prices came quickly after the announcement of the new pig iron and steel prices. The market is still in an unsettled condition with prices tending downward. Heavy melting steel has declined about \$5 a ton, and other grades are from \$1 to \$5 a ton lower. The new prices have been established by dealers in transactions among themselves to cover short sales, there being little if any buying by the mills. The first sales of heavy steel scrap after the announcement of new prices for pig iron and steel were at \$30, but prices declined to \$29 and then to \$28, at which the last reported sales were made. A sale of 750 tons of busheling was made last week at a reported price of \$27, but this grade is now being

offered at \$25. Rerolling steel rails have sold at \$41. Some dealers are still expecting that the Government will regulate scrap prices. Dealers' prices, f.o.b., Cleveland, are as follows:

Per Gross Ton	
Steel rails	\$27.00 to \$28.00
Steel rails, rerolling	40.00 to 41.00
Steel rails, under 3 ft.	31.00 to 32.00
Iron rails	35.00 to 36.00
Steel car axles	45.00 to 46.00
Heavy melting steel	27.50 to 28.50
Carwheels	27.00 to 28.00
Relaying rails, 50 lb. and over ..	50.00 to 60.00
Agricultural malleable	22.00 to 23.00
Railroad malleable	27.00 to 28.00
Light bundled sheet scrap	22.00 to 23.00
Per Net Ton	
Iron car axles	\$44.00 to \$45.00
Cast borings	17.25 to 17.50
Iron and steel turnings and drillings ..	17.00 to 17.50
No. 1 busheling	25.00 to 26.00
No. 1 railroad wrought	35.00 to 36.00
No. 1 cast	25.00 to 26.00
Railroad grate bars	20.50 to 21.50
Stove plate	20.00 to 20.50

Cincinnati

CINCINNATI, Oct. 2—(By Wire).

Pig Iron.—Information as to the correct schedule of prices agreed upon by the Government and leading pig-iron producers is so indefinite that activity has been suspended as far as new contracting is concerned. No sales are reported of either furnace or resale iron and while there are a small number of inquiries out for iron to be shipped this year, quotations are refused because in most cases there is no iron to offer and on that available no price has been made. As far as this territory is concerned, no \$33 iron has been sold for shipment from any district. A perplexing problem yet to be solved is the price of Southern iron at furnace. It is generally understood by melters that the Government agreement calls for a price of \$33, Birmingham. This may be incorrect, and if the usual differential in freight rates is taken into consideration, the final agreement on quotation of Southern iron on the present Government basis will be considerably below the figure named. Little or no interest is taken in iron for the first half delivery, but tentative propositions are under consideration providing for a supply to be shipped in that period and to be invoiced to the customer at the rate adjusted by the Government for that delivery. No contracts have been made on this basis thus far. Melters are urging forward shipments on old contracts and none has asked to cancel contracts made before the Washington meeting. As no sales have been made, prices are not published this week.

(By Mail)

Finished Material.—The jobbers have been receiving a large number of inquiries from both local and out-of-town customers asking for present prices on different kinds of finished material. To all of these letters they have replied that no changes have been made, or contemplated for the present. The mills would be unable to make delivery of either bars or plates. All warehouse figures are unchanged. Business has slowed down considerably, but there is yet a fair volume from customers badly in need of the material ordered. The jobber's price on nails is somewhat weaker, and as low as \$3.80 per keg, base, has been done on some desirable business. The general quotation is \$3.90. Barb wire is moving slowly at 5c. a lb. Local store prices are as follows: Iron and steel bars, 5c.; twisted steel bars, 5.05c.; ¼-in. plates and heavier, 10c.; No. 10 blue annealed sheets, 10c. So far the nearby mills have not changed quotations on black and galvanized sheets and No. 28 sheets are quoted at 8.65c., and galvanized sheets at 10.65c., f.o.b. cars, Cincinnati or Newport, Ky. Very little business is being done at these figures.

Coke.—No new business is reported by the local sales representatives, and while it is understood that the oven operators are willing to accept \$6 per net ton at oven for any coke that can be shipped, just now few of them are able to sell at any figure because they are already so far behind on old contract business. The

situation is easing up a little bit in the Connellsville district and shipments are moving forward a trifle more promptly. In the Wise County, Pocahontas and New River fields there is no change in the situation. It is reported, but not confirmed, that an embargo has been placed on Ashland coke crossing the Ohio River, and if this rumor is correct, it is calculated to curtail the output of furnaces on this side of the river, which are drawing a supply from that district.

Old Material.—The market is very weak and heavy reductions have been made on nearly all kinds of scrap. The revised figures named represent the changes made up to the present writing, but daily reductions are expected until the pig-iron market is somewhat settled. Business is very light and dealers are not disposed to add to their yard stocks under present unsettled conditions. The following are dealers' prices, f.o.b. cars, southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet scrap	\$19.00 to \$19.50
Old iron rails	33.50 to 34.00
Relaying rails, 50 lb. and up	45.50 to 46.00
Rerolling steel rails	34.50 to 35.00
Heavy melting steel scrap	26.50 to 27.00
Steel rails for melting	26.50 to 27.00
Old carwheels	26.00 to 26.50
Per Net Ton	
No. 1 railroad wrought	\$29.50 to \$30.00
Cast borings	13.00 to 13.50
Steel turnings	13.00 to 13.50
Railroad cast	20.00 to 20.50
No. 1 machinery cast	24.00 to 24.50
Burnt scrap	14.00 to 14.50
Iron axles	41.00 to 41.50
Locomotive tires (smooth inside) ..	33.50 to 34.00
Pipes and flues	17.00 to 17.50
Malleable cast	20.50 to 21.00
Railroad tank and sheet	14.50 to 15.00

Birmingham

BIRMINGHAM, ALA., Oct. 2—(By Wire.)

While no actual sales are announced, furnace companies in the Birmingham district maintain the Government rate is \$33 f.o.b. furnaces and inquiries are being answered. It is expected that differentials will be settled this week in Washington. All companies here declare sales previously made will require the iron for the rest of the year.

(By Mail)

BIRMINGHAM, ALA., Oct. 1.—Production of pig iron in the Southern territory will not be disturbed and every effort is being made to get delivery on existing contracts. Consternation over the Government schedule of prices for iron and steel was short lived and better feeling now prevails. Manufacturers of pig iron in the South are waiting for a fuller explanation of the terms of the schedule, especially for differentials to be straightened out. In the meantime, the output at furnaces will be kept at a maximum; in fact, the Trussville furnace will be making iron in the next few days and work of rehabilitating and repairing furnaces in the Sheffield territory is well in hand. Southern pig iron at \$33 per ton f.o.b. furnaces will permit of a reasonable profit, but would make it difficult to compete with Northern iron. Investigations show that there are thousands of tons of iron sold for delivery during the last three months of this year and into 1918 at a price \$40 and better. It is a fact also that there is a large tonnage to be delivered under \$33 per ton. One of the principal companies in the Birmingham district has an aggregate of no less than 125,000 tons on the books sold for delivery during the next nine months, beginning Oct. 1, at prices ranging from \$40 up to \$45. Production of iron during the past month has not been up to expectations by reason of an unsteadiness in the raw material supplies. Increase in wages effective Oct. 1, more settled conditions among labor and more labor, it is figured, will bring about better production of coal, coke, ore and other products.

Old Material.—The scrap iron and steel, old material, market in the South is feeling an effect of the Government fixing of prices for iron and steel and a pronounced fall in prices is looked for. One of the larger consumers of scrap in the South has notified dealers that it will not begin to pay the prices that

have prevailed heretofore for scrap. Heavy melting steel will be one of the principal products to feel the effects of the bombardment.

Old material prices are given, nominally, as follows:

Old steel axles.....	\$32.00 to \$33.00
Old steel rails.....	24.00 to 25.00
No. 1 wrought.....	25.50 to 26.00
Heavy melting steel.....	20.50 to 21.50
No. 1 machinery.....	24.50 to 25.00
Car wheels.....	23.00 to 24.00
Tramcar wheels.....	20.00 to 21.00
Stove plate.....	18.50 to 19.00
Shop turnings.....	15.00 to 16.00

Philadelphia

PHILADELPHIA, Oct. 2.

The Philadelphia market is marking time. The only interests which have fallen promptly into line with the new Government prices are the producers of pig iron. A few sales have been made, notably 1000 tons of gray forge iron at \$33, furnace, and a total of 1000 or more tons of No. 2 X foundry iron in small lots at the same price. In view of the fact that no price has yet been fixed on other grades, sales cannot be negotiated except with the price left open, as was the case with a sale of 200 tons of standard low phosphorous iron. Sales of furnace coke have entirely ceased, offices here having been notified by their principals that they have none now to offer. Ferromanganese has declined sharply as a result of expected price-fixing, and sales at \$325 for spot delivery have been made. There are no developments in finished material so far as sales are concerned. So far as could be learned, not a pound of plates, structural material or plates has been sold at the new prices, though several thousand tons of steel bars were sold for export to the Far East at prices ranging from 4.50c. to 4.75c.

Coke.—When the new price was announced, coke sellers here seemed satisfied and a few spot lots of furnace were sold at the \$6 quotation. Later, however, sales agencies were notified to make no commitments. Before the new price went into effect, the coke producers found it profitable to sell considerable quantities at the spot prices, which were higher than the contract prices, but now the situation is reversed and it becomes more profitable for them to ship on contracts than to sell at the control price. In justification of the policy now being followed by the coke manufacturers, it is pointed out that since the new price was announced the Fuel Administration has sent them many priority orders, some of which are confusing and conflicting, and that until the situation is straightened out, little, if any, coke will be available in the open market. One sales office took an order last week from a regular customer for a small tonnage of foundry coke, with price to be fixed later, but business in foundry coke is generally at a standstill and probably will remain so until the control price, which is expected to be about 50 cents a ton above that of furnace coke, is definitely determined.

Ferroalloys.—In anticipation of further Government price fixing which will affect ferroalloys, the price of ferromanganese has declined and sales have been made during the week for spot delivery at as low as \$325. About 1000 tons in small lots were sold in this market, and the highest price reported is \$350. Spiegeleisen is still quoted at \$78 to \$80, furnace, but is weak at that price and probably lower could be done.

Sheets.—Expectation of Government price fixing has checked all business except some small lots needed for immediate use, which are reported to have been sold at prices previously reported: 8c. to 8.50c., Pittsburgh, for No. 10 blue annealed; 8c. to 8.50c. for No. 28 black, and 10c. to 10.50c. for No. 28 galvanized.

Pig Iron.—There were several sales of pig iron in this market during the past week at the new prices. One lot of 1000 tons of gray forge iron was sold at \$33, furnace. A Virginia furnace sold about 600 tons of No. 2 X foundry at the control price and other offices sold small lots, the total sales of foundry iron possibly reaching 1000 to 1200 tons. A foundry in this district is reported to have made a resale of a small tonnage

of No. 2 X foundry iron at \$40. Two hundred tons of standard low phosphorous iron was sold at price to be fixed later in accordance with the decision of the pig-iron committee now considering the new schedules. There were a number of inquiries, some of them for next year, which developed the fact that none of the furnaces seems to know how it stands with regard to taking contracts for delivery beyond Jan. 1. Consumers express a desire to see this question settled speedily, so they can make their own price schedules. There have been suggestions from consumers that the furnaces take contracts for next year on an open-price basis, but this the furnaces do not seem willing to do, as they fear a price revision on Jan. 1 which might send price of iron so low that they could not operate at a profit. The opinion is advanced in some quarters that there is nothing to prevent furnaces from contracting as far ahead as they like at the \$33 base price, but the answer generally to this suggestion is that the furnaces are not willing at this time to take on much tonnage for forward delivery at the \$33 price, deliveries of which might interfere with deliveries of iron already under contract at higher prices. Inquiry among representatives of furnaces as to the average price of iron shipments now being made reveals that this average varies considerably at different furnaces. In most instances, it is above \$30 and some of the furnaces which have been blown in during recent months will average \$40 to \$45 per ton. This is particularly true of a few Virginia furnaces. Lack of fuel is worrying furnaces and because of the fear that some may be forced out of blast on this account it is predicted in sales offices that comparatively little spot iron will now be available. It is said that furnaces will pile up reserve stocks in anticipation of any emergency which might leave them short of iron and therefore unable to make deliveries on existing contracts. There have been few, if any, attempts to cancel contracts, consumers on the other hand generally urging quick deliveries for work they have in hand. As their product has been sold at a price based on their pig-iron contracts, their chief concern is not with prices but with deliveries. Some of the offices here will now quote prices only at furnace and those which sell Alabama iron predict that the price of Southern iron at furnace will be the same as for a similar grade of iron at a Northern furnace, and that no concessions will be made to equalize freight rates. We quote the following standard brands, at furnace (freight rate to destination must be added):

Eastern Pennsylvania No. 2 X foundry.....	\$33.00
Gray forge.....	33.00

Structural Material.—Since the fixing of prices, large requisitions have been received by mills from the Government for ship shapes and material for the shops which will fabricate buildings to be erected for the Army in France. The fact that the Government let a large number of buildings at a cost of \$140 per ton for fabricated material is taken as an indication that it will make no attempt to limit charges for fabrication even for its own work. Some mills which have their own fabricating shops are prepared to quote on fabricated material, though deliveries are somewhat uncertain, but of plain material they have nothing to offer, reserving what excess over contracts they may produce for the Government, whose requirements, it is asserted, will be heavy from now on. The Tacony Ordnance Corporation has let 1750 tons of fabricated material for its new gun forging plant at Tacony, Pa., to the Belmont Iron Works at a price reported to be considerably above the new Government price for plain material. We quote 3c., Pittsburgh, base, with the usual trade differential and extras.

Plates.—Except for Government account, nothing has been done in plates in this market at the new price. It is rumored in the trade that one or two mills are continuing to accept business at the old prices, but this rumor lacks confirmation. The smaller mills are still insisting that they cannot come out whole at the new price. Those which roll plates from slabs, which they have contracted for at high prices, will probably not lose on business which they had booked prior to the price announcement, but should the Government give

them orders for plates at the 3.25c. price they would obviously face a perplexing problem. In such an instance, it is pointed out, they would undoubtedly ask the Government to furnish them with the material from which to make their plates. A producer of plates from the pig iron insists that it cannot profitably make 3.25c. plates from pig iron which costs \$33, and some of its iron contracts are at higher figures than this, though the average is probably less. Regarding the possibility of domestic consumers of plates not on Government work getting orders filled a plate mill operator made this statement: "Most mills are filled up for the remainder of this year and several months into next year with Government orders, direct and indirect, so that with this condition there will be practically nothing new booked until the mills work down their order books and have a chance to establish a policy based on the new conditions. The commercial trade is perfectly willing, in fact, anxious, to pay higher prices for plates and is clamoring to get orders on the books of the mills, but on account of the situation as just explained is unable to place business." Some of the plate mills which some time ago booked considerable Japanese business are now rolling the plates for shipment to Pacific Coast ports, where they are to be stored pending a settlement of the embargo. A steel export company, which has large Japanese orders, estimates that probably 100,000 tons are now being rolled at different mills throughout the East. It is predicted that the Government may soon make an announcement permitting the exportation to Japan of plates which were bought prior to July 15, when the embargo went into effect. It is admitted that there is nothing substantial to base this prediction upon, but the fact that the Japanese are paying money to have the plates rolled, and the further fact that one or more railroads, the Union Pacific in particular, have agreed to accept shipments to the Pacific Coast are pointed to as significant indications of what may develop. It is intimated that the policy of the Government will be to release only those plates which are for ships actually under construction in Japan, but none for ships under contract, work on which has not yet been started. We quote 3.25c., base, but are without knowledge of any sales at this price.

Billets and Slabs.—Billets and slabs remain nominally on the basis of \$70 for open-hearth re-rolling billets, though none has been sold in this district since the announcement of Government control prices on other products. A small tonnage of slabs for spot delivery was offered to a number of consumers at \$85, but no one was found who wanted them badly enough to pay this price. Though prices on open hearth and Bessemer re-rolling billets will probably be fixed at about \$15 above pig iron prices, or about \$48, we continue to quote \$70 as a nominal price.

Iron and Steel Bars.—In view of the probability of Government price fixing on bar iron, some of the makers in this district have shown a willingness to accept contracts for the remainder of this year and first quarter of next year at prices ranging from 4.25c. to 4.50c., Pittsburgh. Consumers who wish to be sure of future supply have apparently not hesitated at these prices, though knowing that any price the Government will fix will undoubtedly be lower. Against these new contracts the bar iron mills have placed orders for wrought scrap and borings and turnings. Some of the larger producers of bar iron, who are well sold ahead, adhere to previously quoted prices of 4.75c. to 5c., Pittsburgh. There is no domestic business in steel bars, but one company here last week sold several thousand tons for export to the Far East at prices ranging from 4.50c. to 4.75c., for delivery this year. Mills show no disposition to consider new contracts based on the new Government price of 2.90c., Pittsburgh. Their output for some months is well covered by contracts, which, with Government orders, place them in a position where they prefer to do nothing with regard to additional business for the present.

Rails.—Several lots of light rails up to 40 lb. have been sold in the past week, mostly for mines, at prices ranging from 3.50c. to 3.90c., Pittsburgh.

Wire Nails.—Nine thousand kegs of nails were sold

by an Eastern Pennsylvania maker for export this year to the Far East at \$4 per keg, base Pittsburgh.

Old Material.—Dealers are still somewhat at sea as regards prices and trading is largely confined to transactions among themselves, which have had a tendency to bring out lower quotations. On the monthly list of the Pennsylvania Railroad Co. issued this week, many dealers were at a loss how to bid, there being a feeling that buying is hazardous under present conditions. Except for a few sales to bar iron makers, there is no demand from the mills and brokers are pursuing a very safe policy with regard to their own purchases. The Committee on Iron and Steel Scrap of the Council of National Defense has been holding meetings with officials of the American Railways Association to devise ways of correcting existing methods of transportation of scrap for the general improvement of railroad efficiency. We quote the following delivered prices based on sales in the Philadelphia district during the past week:

No. 1 heavy melting steel.....	\$25.00 to \$28.00
Steel rails, re-rolling	41.00 to 43.00
Low phosphorus heavy melting.....	40.00 to 43.00
Old iron rails	43.00 to 45.00
Old carwheels	29.00 to 31.00
No. 1 railroad wrought.....	43.00 to 45.00
No. 1 forge fire	21.00 to 22.00
Bundled sheets	21.00 to 22.00
No. 2 busheling	15.00 to 16.00
Machine shop turnings (for blast furnace use)	15.00 to 16.00
Machine shop turnings (for rolling mill use)	18.00 to 19.00
Cast borings (for blast furnace use) ..	15.00 to 16.00
Cast borings (clean)	19.00 to 20.00
No. 1 cast	28.00 to 30.00
Grate bars	19.50 to 20.00
Stove plate	19.50 to 20.00
Railroad malleable	32.50 to 35.00
Wrought iron and soft steel pipes and tubes (new specifications).....	29.00 to 30.00

St. Louis

ST. LOUIS, Oct. 1.

Pig Iron.—The Government fixing of prices, with no intimation as yet as to the basis of calculation of figures to be set at other markets than Pittsburgh has put an end to all transactions at this point for the present. The representatives of the furnaces have been flooded with inquiries, almost altogether on small lots, since the announcement from Washington, but no selling has been possible, as no figures have been received from the furnaces to give a basis of action in this trade territory. On contracts already in effect, however, there has been urgency in the demand for shipment and consumers are very anxious to get the material they have ordered, as needs therefor are becoming acute as the supplies on hand drop lower. Melters are by no means covered for 1918 and there is every reason to believe that there will be active buying as soon as it can be determined just how to go ahead on contracts.

Coke.—The coke situation is on all fours with that of pig iron and there has been no business in the market. Melters are fairly well covered under previous contracts, however, and therefore are not immediately concerned as to the situation. The local by-product plant is well sold ahead and therefore is cutting no particular figure in the market at the present time.

Finished Iron and Steel.—As no buying has been possible on contracts for finished products other than deliveries under specifications for material already signed up for, the fixing of prices by the Government has had no immediate effect on local conditions. No changes have been posted on finished material as yet and prices are held as heretofore. Movement out of warehouse continues very active and up to the capacity of the warehouses to meet—in some cases considerably beyond supplies on hand. For stock out of warehouse, we quote as follows: Soft steel bars, 4.55c.; iron bars, 4.50c.; structural material, 5.05c.; tank plates, 10.05c.; No. 10 blue annealed sheets, 10.05c.; No. 10 black sheets, cold rolled, one pass, 10.35c.; No. 28 galvanized sheets, black sheet gage, 11.75c.

Old Material.—Scrap is decidedly lower in tone at least, though there have been no transactions upon

which real quotations could be made. The effect of the Government price-fixing order has been to make the buyers offer lower prices, but the dealers are disposed to hold firm, believing that there will be sufficient call for scrap to hold it up well within the recent range. As a result there has been no business of consequence done during the past week. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	\$38.00 to \$38.50
Old steel rails, rerolling	36.00 to 36.50
Old steel rails, less than 3 ft.	35.00 to 35.50
Relaying rails, standard section, subject to inspection	50.00 to 55.00
Old car wheels	29.00 to 29.50
No. 1 railroad heavy melting steel scrap	28.50 to 29.00
Heavy shoveling steel	27.00 to 27.50
Ordinary shoveling steel	24.00 to 24.50
Frogs, switches and guards cut apart	28.50 to 29.00
Ordinary bundled sheet scrap	18.50 to 19.00
Heavy axle and tire turnings	18.00 to 19.00

Per Net Ton	
Iron angle bars	\$37.00 to \$37.50
Steel angle bars	26.00 to 27.00
Iron car axles	42.00 to 43.00
Steel car axles	40.00 to 40.50
Wrought arch bars and transoms	39.50 to 40.00
No. 1 railroad wrought	33.50 to 34.00
No. 2 railroad wrought	31.50 to 32.00
Railroad springs	29.50 to 30.00
Steel couplers and knuckles	34.50 to 35.00
Locomotive tires, 42 in. and over, smooth inside	37.00 to 37.50
No. 1 dealers' forge	24.50 to 25.00
Cast iron borings	14.50 to 15.00
No. 1 busheling	23.00 to 23.50
No. 1 boilers, cut to sheets and rings	19.50 to 20.00
No. 1 railroad cast scrap	19.00 to 19.50
Stove plate and light cast scrap	14.00 to 14.50
Railroad malleable	27.00 to 28.00
Agricultural malleable	22.00 to 22.50
Pipes and flues	20.00 to 20.50
Heavy railroad sheet and tank scrap	16.00 to 16.50
Railroad grate bars	16.50 to 17.00
Machine shop turnings	15.50 to 16.00
Country mixed scrap	14.50 to 15.00

Buffalo

BUFFALO, Oct. 1.

Pig Iron.—The market is at a standstill until the regular price differentials for the various grades of pig iron are worked out and determined upon from the basis of \$33.00 f.o.b. cars at furnace as set by the Government for No. 2X foundry and basic iron. As a rule inquiries received, and they are numerous, are simply filed and acknowledged with the information that furnaces are not prepared to quote until the differential scale is fixed. No sales whatever have been reported for the week. Furnaces are not seeking business at this juncture, and all the iron produced is being applied on old contracts, or held in readiness to be supplied on any Government requirements that may be requisitioned for. It is therefore impossible to quote any schedule of prices at the present time.

Finished Iron and Steel.—A waiting policy is manifest on the part of mills, and all new business except such as applies directly on Government orders is held in abeyance until decision is made as to what business, aside from Government specification, is to have precedence. Government orders are becoming plentiful, and there have been many inquiries from domestic territory and from Canada, particularly for bars and shapes for agricultural and industrial purposes. Some of this inquiry, however, apparently represents the attempt of certain buyers to sound out the market with sources of supply from which they have not been accustomed to buy, in order to determine what steps, if any, they can take to relieve themselves of previous high-priced purchases. The various selling agencies, on the other hand, are under instructions from headquarters to decline to quote on practically all inquiries, and this undoubtedly will be their policy until it is clearly determined how much steel of the "A" and "B" classification will be necessary to meet the requirements of the United States Government and the Allies. This indicates a considerable scarcity of steel for use by the general public for some months to come.

Old Material.—Owing to the scarcity of heavy melting steel and some other commodities the market remains firm, although very little business has been transacted during the week. Prices of scrap materials have

not been very much affected as yet by the Government's action in the fixing of prices for pig iron and finished steel. Unless some decided action is taken by the Government establishing prices on the different grades of scrap, there will be no decrease in schedules, and increased demand would undoubtedly bring quotations to a higher level. Scarcity of gondola cars and embargoes in effect at many outside consuming points have restricted movement of scrap almost to a minimum. This situation is likely to seriously interfere with mill activity and production unless some decided action is taken to have cars furnished promptly and to remove or relieve the restrictions now placed by the railroads against the movement of scrap. It is understood that the Government will take some action this week that will clarify the situation both as to any contemplated fixing of prices and the protecting of deliveries.

We continue prices in force for the past week, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	\$31.50 to \$33.00
Low phosphorus	41.00 to 42.00
No. 1 railroad wrought	43.00 to 44.00
No. 1 railroad and machinery cast	30.00 to 31.00
Iron axles	45.00 to 47.00
Steel axles	45.00 to 47.00
Carwheels	35.00 to 36.00
Railroad malleable	32.00 to 33.00
Machine shop turnings	18.00 to 19.00
Heavy axle turnings	26.00 to 27.00
Clean cast borings	20.00 to 21.00
Iron rails	43.00 to 44.00
Locomotive grate bars	20.00 to 21.00
Stove plate	21.00 to 22.00
Wrought pipe	28.00 to 29.00
No. 1 busheling scrap	28.00 to 29.00
No. 2 busheling scrap	18.00 to 19.00
Bundled sheet stamping scrap	20.00 to 27.00

British Steel Market

Pig Iron Active and Steady—Tin Plates Firm and Ferromanganese Strong

(By Cable)

LONDON, ENGLAND, Oct. 3.

Cleveland pig iron is active and the stringency in hematite iron is less intense. Tin plates are firmer. Ferromanganese is idle but strong. American wire rods for October-November delivery have sold at £29 10s. with early arrivals at £28, c.i.f.

Benzol is quoted at 12d. per gal. with toluol at 2s. 4d. and solvent naphtha at 2s. 9d. We quote as follows:

Tin plates, coke, 14 x 20; 112 sheets, 108 lb., f.o.b. Wales, maximum, 30s.
Ferromanganese, £45 nominal.
Ferrosilicon, 50 per cent, c.i.f., £35 upward.
On other products control prices are as quoted in THE IRON AGE of July 19, p. 171.

(By Mail)

Strong Pressure for War Material—Official Prices for Plates Expected

LONDON, ENG., Sept. 11.—The predominant feature in the British industry obviously continues to be the high pressure of operations directly connected with essential war requirements, and the strain upon the steel sections is of greater intensity, with not the least prospect of any relaxation over the remainder of the year. Under the close control of the authorities, output is being urged as rapidly as possible, and seems adequate in spite of the difficulties encountered by the mills through shortcomings in fuel and skilled labor. As the great bulk of production is being requisitioned for Government work, the surplus left for industrial purposes is now very small, and merchant business is well nigh extinct. Further Government restrictions have been enforced lately in the plate and sheet markets.

There is no important change in the position of pig iron, although the tendency has shown additional firmness due to the fact that current output is on the whole more quickly absorbed, even in the case of foundry grades. The surplus supply of these is becoming comparatively light, since the output has been checked somewhat by the additional furnaces which have been put on basic iron, in accordance with an appeal made by the authorities to furnace owners. Consumers in

the Midlands and Scotland have shown more eagerness to cover themselves ahead, thus causing more stringent conditions. The supply of forge and foundry material, however, is sufficient to go round, and there is no fear of any serious shortage arising, even allowing for the continuance of exports to allies on a respectable scale.

No official statement has yet been made regarding the proposed price control in black sheets, although it is understood that the basic quotation for close annealed No. 24 galvanized sheets was recently fixed at £17 10s. net at makers' works. Some works are inclined meantime to disregard the proposed change, and still quote old prices, and business is practically at a standstill. Makers generally are full of Government work for the next few months, and simply wait developments. There is some opposition to the intended price restrictions, as makers contend that the above basis is too low, and leaves little or no profit for rolling except to big works producing their own steel.

It is expected that official prices will soon be fixed for black plates. There is no change in the position of tin plates. All orders are now subject to a Government certificate at the official maximum basis of 30s. per box net at makers' works. The tone is firm, although the maximum basis is occasionally shaded for stray lots of light plates.

There is nothing new in ferromanganese, very little business having been done in the last few weeks. Sellers are rare, and hardly inclined to shade prices, which stand nominally at £80 f.o.b. for the Continent, and \$375 to \$400 c.i.f. for North American ports for far forward shipment. Makers are virtually out of the market.

New York

NEW YORK, Oct. 3.

Pig Iron.—The pig iron market is very slowly adjusting itself to new conditions. The sale of 2000 tons of No. 3 plain has been made to a New Jersey machinery company for its foundry at \$32, furnace, and this company will probably purchase from 5000 to 10,000 tons additional for foundries which are making castings for it. For No. 2 plain \$32 has also been quoted. Unlimited sales of No. 2 X are reported at \$33, furnace. No sales of Southern iron are reported in this territory. Inquiries for various grades are numerous and it is believed that when the differentials on all grades are definitely established buying will be liberal. One inquiry pending is for 900 tons of 1.75 per cent to 2.25 per cent silicon and 900 tons of 3 per cent to 3.50 per cent silicon for first quarter delivery to a New Jersey foundry. For early delivery we quote as follows tidewater on those grades on which prices have been fairly established, omitting other grades for the present:

No. 2 X.....	\$33.75
No. 3 plain.....	32.75

Ferroalloys.—That the price of ferromanganese will be fixed by the Government along with prices of all iron and steel products is the topic uppermost in this market. No one, however, is able to even guess at what the price may be. The quotation on the domestic alloy for delivery this year or next is now \$350, though some spot material in carload lots has sold at \$375. Demand is almost nothing and the market is extremely dull. Arrivals in September are reported to have been better than in either August or July when the average was less than 2000 per month. Spiegeleisen, 20 per cent, is quoted at \$80, furnace. About 3000 tons is before the market. Ferrosilicon, 50 per cent, has been quoted at \$140 to \$165 for delivery next year, but it is believed that these prices have not been established on contracts. Some transactions are known to have been put through at \$130. The Carnegie Steel Co. has covered for its 1918 requirements, which will be 20,000 tons as minimum and 30,000 tons as maximum, at a price believed to be somewhere near the above figure. For material needed this year about \$200 is asked and has been obtained.

Finished Iron and Steel.—No quotations have been made at the fixed prices announced Sept. 24. With filled

order books and large demands expected from the Government, mills are not committing themselves. Buyers seem to sense the situation and latterly there have been few inquiries from either domestic or export sources except in products not yet affected by a fixed price or subject to export license. Selling is proceeding in wire at prices equivalent to 4c. and higher, plain wire base, and bar iron buying is fairly active with reports that in spite of relatively high prices obtaining third quarter contracts have been pretty fully specified. About the only sizable inquiry in finished steel learned of, covers 8500 tons of standard section rails for China. It is said that fabricators on new projects are figuring on the basis of 3c., Pittsburgh, for the plain material, but mills are not expected to accept such business without a permit, the point being that if general business does not sooner or later call for licenses from the Priority Board, mills are likely to consider seriously only those for war purposes and thus authorized. The New York Shipbuilding Co. plans extensions involving 2000 tons, the Philadelphia & Reading is to build a 1500-ton bridge in Philadelphia and the Philadelphia Electric Light power house is again up for consideration. The Mount Vernon Bridge Works has been awarded 650 tons for the Chesapeake & Ohio and five additional buildings for France are to be placed by the Stone & Webster Engineering Corporation, involving a total of about 4500 tons, four to the American Bridge Co. and one to Whitehead & Kale. In the absence of new business we continue to quote the prices obtaining two weeks ago, or for mill shipments of structural material 4.445c. to 5.195c., New York; plates 8.195c. and higher, New York; steel bars over the rest of this year 4.195c. to 4.695c., New York, and iron bars at 4.945c. From New York district warehouses steel and iron bars and shapes are quoted at 5c. to 5.50c. and plates at 8c. and higher.

Cast Iron Pipe.—Prices on cast iron pipe are still held nominally at \$65.50 per ton for 6 and 8-in. and heavier and \$68.50 for 4-in., the reason assigned being that pipe now being offered for sale was made from pig iron bought at prices much higher than those recently announced from Washington. There is no buying of pipe, however, and the willingness of sellers to cut prices was shown in the recent bidding on 310 tons for Jersey City, reported last week, when the lowest bid was \$58.34 and the highest \$64.75. It is expected that revision of cast iron pipe prices will come at a not far distant date.

Old Material.—Old material prices are settling to a level in harmony with quotations on pig iron, as named in the Washington agreement. Heavy melting steel for shipment to either eastern Pennsylvania or Pittsburgh, is now quoted at \$25 to \$26, New York, a reduction of about \$2 to \$3. Nearly all grades have declined to that extent, while relaying rails are much lower and are now being quoted at \$45 to \$50. There is no official information as to whether the Government will take any action in regard to scrap, but it seems probable that such action will come soon. We quote prices of brokers as follows to New York producers and dealers, per gross ton, New York:

Heavy melting steel scrap (for shipment to eastern Pennsylvania).....	\$25.00 to \$26.00
Old steel rails (short lengths) or equivalent heavy steel scrap.....	25.00 to 26.00
Relaying rails	45.00 to 50.00
Rerolling rails	33.00 to 34.00
Iron and steel car axles.....	41.00 to 42.00
No. 1 railroad wrought.....	32.00 to 33.00
Wrought-iron track scrap.....	27.00 to 28.00
No. 1 yard wrought long.....	27.00 to 28.00
Light iron	7.00 to 8.00
Cast borings (clean).....	16.00 to 17.00
Machine-shop turnings.....	14.00 to 15.00
Mixed borings and turnings.....	13.00 to 14.00
Wrought-iron pipe (1 in. minimum diameter, not under 2 ft. long).....	25.00 to 26.00

For cast-iron scrap, dealers in New York City and Brooklyn are quoting as follows to local foundries per gross ton:

No. 1 machinery cast.....	\$25.00 to \$26.00
No. 1 heavy cast (column, building material, etc.)	22.00 to 23.00
No. 2 cast (radiators, cast boilers, etc.)	22.00 to 23.00
Stove plate	16.00 to 17.00
Locomotive grate bars.....	16.00 to 17.00
Malleable cast (railroad).....	28.00 to 29.00
Old carwheels	28.00 to 29.00

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 19.5c.; Philadelphia, 18.5c.; Boston, 21.5c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c.; Denver pipe, 76.1c.; minimum carload, 46,000 lb.; structural steel and steel bars, 76.1c., minimum carload, 40,000 lb.; Pacific coast (by rail only), pipe, 65c.; structural steel and steel bars, 75c., minimum carload, 60,000 lb. No freight rates are being published via the Panama Canal, as the boats are being used in transatlantic trade.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, 1/4 in. thick and over, and zees 3 in. and over, 4.00c.

Wire Products

(Prices of independent mills)

Wire nails, \$4 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails, taking an advance over this price of \$2, and shorter than 1 in., \$2.50. Bright basic wire, \$4.05 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.95; galvanized wire, \$4.65; galvanized barb wire, and fence staples, \$4.85; painted barb wire, \$4.15; polished fence staples, \$4.15; cement-coated nails, \$3.90 base, these prices being subject to the usual advances for the smaller trade all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 43 per cent off list for carload lots, 42 per cent off for 1000-rod lots, and 41 per cent off for small lots, f.o.b. Pittsburgh.

Nuts and Bolts

Discounts in effect for large buyers are as follows, delivered in lots of 300 lb. or more, when the actual freight rate does not exceed 20c. per 100 lb., terms 30 days net, or 1 per cent for cash in 10 days.

Carriage bolts, small, rolled thread, 40 per cent; small cut thread, 35 and 2 1/2 per cent; large, 25 per cent.

Machine bolts, h. p. nuts, small, rolled thread, 40 and 10 per cent; small cut thread, 40 per cent; large, 30 per cent.

Machine bolts, c. p. c., and t. nuts, small, 30 per cent; large, 20 per cent. Bolt ends, h. p. nuts, 30 per cent with c. p. nuts, 20 per cent. Lag screws (cone or gimlet point), 45 per cent.

Nuts, h. p. sq. blank, \$1.70 off list, and tapped, \$1.50 off; hex. blank, \$1.50 off, and tapped, \$1.30 off; nuts, c. p. c. and t. sq. blank, \$1.25 off; and tapped, \$1.00 off; hex. blank, \$1.25 off, and tapped, \$1.00 off. Semi-finished hex. nuts, 50 and 10 per cent. Finished and case-hardened nuts, 50 and 10 per cent.

Rivets 7/16 in. in diameter and smaller, 40 per cent.

Wire Rods

Soft Bessemer and open-hearth rods to domestic consumers at \$90 to \$95; high-carbon rods made from ordinary open-hearth steel \$95 to \$100, and special steel rods with carbons running from 0.40 to 0.60, \$100 to \$110 at mill; above 0.60 carbon, \$115 to \$120.

Railroad Spikes and Track Bolts

Railroad spikes 9/16 in. and larger, \$7.00, 7/16 in. and 1/2 in., \$7.00 base. Boat spikes are occasionally quoted \$7.00 to \$8.00, all per 100 lb., f.o.b. Pittsburgh, but some makers are quoting higher. Track bolts with square nuts, 7c. to 7.50c. to railroads, and 8c. to 8.50c., in small lots, for fairly prompt shipment.

Steel Rails

Angle bars at 3.50c. to 3.75c. at mill, when sold in connection with orders for standard section rails, and on carload and smaller lots, 4c. to 4.25c. at mill. Light rails, 25 to 45 lb., \$75 to \$80; 16 to 20 lb., \$80 to \$81; 12 and 14 lb., \$82 to \$83; 8 and 10 lb., \$83 to \$84; in carload lots, f.o.b. mill, with usual extras for less than carloads. Standard Bessemer rails, \$38; open-hearth, \$40, per gross ton, Pittsburgh.

Tin Plate

Effective July 31, prices on all sizes of terne plate were advanced from \$2 to \$2.50 per package and are now as follows: 8-lb. coating, 200 lb., \$16 per package; 8-lb. coating, I. C., \$16.30; 12-lb. coating, I. C., \$17.50; 15-lb. coating, I. C., \$18.25; 20-lb. coating, I. C., \$19; 25-lb. coating, I. C., \$20; 30-lb. coating, I. C., \$21; 35-lb. coating, I. C., \$22; 40-lb. coating, I. C., \$23 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 4c. to 4.50c. for delivery late this year, and 4.50c. to 5c. from warehouse, in small lots for prompt shipment. Refined iron bars, 4.75c., railroad test bars, 5.25c. in carload and larger lots f.o.b. mill.

Wrought Pipe

The following discounts on steel are to jobbers for carload lots on the Pittsburgh basing card in effect from May 1, 1917, all full weight, except for LaBelle Iron Works and Wheeling Steel & Iron Co., which quote higher prices, and National Tube Co., which adheres to card of April 1.

Steel			Butt Weld		
Inches	Black	Galv.	Inches	Black	Galv.
1/4, 1/2 and 3/4	42	15 1/2	1/4 and 1/2	23	+4
1/2	46	31 1/2	3/4	24	+3
3/4 to 3	49	35 1/2	1 to 1 1/2	28	10
			3/4 to 1 1/2	33	17
Lap Weld			Lap Weld		
2	42	29 1/2	2	26	12
2 1/2 to 6	45	32 1/2	2 1/2 to 6	28	15
7 to 12	42	28 1/2	7 to 12	25	12
13 and 14	32 1/2	..			
15	30	..			
Butt Weld, extra strong, plain ends			Butt Weld, extra strong, plain ends		
1/4, 1/2 and 3/4	38	20 1/2	1/4, 1/2 and 3/4	23	5
1/2	43	30 1/2	3/4	27	14
3/4 to 1 1/2	47	34 1/2	1 to 1 1/2	33	18
2 to 3	48	35 1/2			
Lap Weld, extra strong, plain ends			Lap Weld, extra strong, plain ends		
2	40	28 1/2	2	27	14
2 1/2 to 4	43	31 1/2	2 1/2 to 4	29	17
4 to 6	42	30 1/2	4 1/2 to 6	28	16
7 to 8	38	24 1/2	7 to 8	20	8
9 to 12	33	19 1/2	9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5 1/2 points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

Boiler Tubes

Nominal discounts on less than carload lots, freight added to point of delivery, effective from Nov. 1, 1916, on standard charcoal iron tubes and from April 2, 1917, on lap-welded steel tubes are as follows:

Lap-Welded Steel	Standard Charcoal Iron
1 1/2 and 2 in.	1 1/2 in.
2 1/2 in.	1 1/2 and 2 in.
2 1/2 and 2 1/2 in.	2 1/2 in.
3 and 3 1/2 in.	2 1/2 and 2 1/2 in.
3 1/2 to 4 1/2 in.	3 and 3 1/2 in.
5 and 6 in.	3 1/2 to 4 1/2 in.
7 to 13 in.	5 and 6 in.
	7 to 13 in.

Above discounts apply to standard gages and to even gages not more than four gages heavier than standard in standard lengths. Locomotive and steamship special charcoal grades bring higher prices.

1 1/2 in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

3 in. and larger, over 22 ft., 10 per cent net extra.

Sheets

Makers' prices for mill shipments on sheets of United States standard gage, in carload and larger lots, are as follows, 30 days net or 2 per cent discount in 10 days: [Open-hearth stock, \$5 per ton above these prices.]

Blue Annealed—Bessemer	Cents per lb.
Nos. 3 to 8	8.00 to 8.50
Nos. 9 and 10	8.25 to 8.50
Nos. 11 and 12	8.50 to 8.75
Nos. 13 and 14	8.75 to 9.00
Nos. 15 and 16	9.00 to 9.25

Box Annealed, One Pass Cold Rolled—Bessemer	Cents per lb.
Nos. 17 to 21	8.30 to 8.80
Nos. 22 and 24	8.35 to 8.85
Nos. 25 and 26	8.40 to 8.90
No. 27	8.45 to 9.00
No. 28	8.50 to 8.95
No. 29	8.55 to 9.05
No. 30	8.65 to 9.15

Galvanized Black Sheet Gage—Bessemer	Cents per lb.
Nos. 10 and 11	8.50 to 9.00
Nos. 12 and 14	8.60 to 9.10
Nos. 15 and 16	8.75 to 9.25
Nos. 17 to 21	8.80 to 9.40
Nos. 22 and 24	9.05 to 9.55
Nos. 25 and 26	9.20 to 9.70
No. 27	9.35 to 9.85
No. 28	9.50 to 10.00
No. 29	9.75 to 10.25
No. 30	10.00 to 10.50

Tin-Mill Black Plate—Bessemer	Cents per lb.
Nos. 15 and 16	7.80 to 8.30
Nos. 17 to 21	7.85 to 8.35
Nos. 22 to 24	7.90 to 8.40
Nos. 25 to 27	7.95 to 8.45
No. 28	8.00 to 8.50
No. 29	8.05 to 8.55
No. 30	8.05 to 8.55
Nos. 30 1/2 and 31	8.10 to 8.60

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery.							
Copper, New York		Tin		Lead		Spelter	
Sept.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
26.....	23.50	23.50	61.75	7.95	7.82½	8.50	8.25
27.....	23.50	23.50	61.62½	7.95	7.82½	8.50	8.25
28.....	23.50	23.50	61.25	7.95	7.82½	8.37½	8.12½
29.....	23.50	23.50	....	7.95	7.82½	8.37½	8.12½
Oct.							
1.....	23.50	23.50	60.50	7.95	7.82½	8.37½	8.12½
2.....	23.50	23.50	60.50	7.95	7.82½	8.37½	8.12½

NEW YORK, Oct. 3.

The metals are dull and featureless. Copper is dead and nominal. Tin is inactive and lower. Lead is quiet and steady. Spelter is again in poor demand. Antimony is unchanged.

New York

Copper.—Buying of copper is at a standstill. Producers generally are disinclined to enter upon contracts with ordinary domestic consumers at the Government price of 23.50c. until it is known how much metal the Government and its allies will require. The fixing of a price for copper, which was expected to be a benefit to the market, has thus far resulted in a deadlock. The question as to whether the various grades of copper are all to be governed by the same price is still unsettled. Rumors were current yesterday that many if not all of the perplexing questions which confront the market as a whole would be decided within the next day or so. It is admitted that consumers desiring small lots, particularly from jobbers, are being accommodated at from 26c. to 28c. per lb. We continue to quote the Government price of 23.58c., New York, as nominal for both Lake and electrolytic. The London market has declined and was £125 for spot electrolytic and £121 for futures on Oct. 1.

Copper Averages.—The average price on both Lake and electrolytic copper for the month of September, based on daily quotations in THE IRON AGE, was 24.90c.

Tin.—The entire week has been extremely quiet and there has been considerable complaint because of delayed cables from London, which has decidedly interfered with business. The principal sales of the week were reported to have been made on last Wednesday and Thursday. On the former day 25 tons of December shipment from the Straits was sold at 57.25c. and 25 tons of January shipment at 57.12½c. On Thursday transactions involving about 100 tons were recorded, 25 tons of which were spot metal at 61.62½c. About 50 tons of December-January shipment from the Straits went at 57.35c. On Friday there were a few sales of spot metal at 51.25c. So far this week the market has been duller than at any time, with practically no sales reported up to this morning. A small quantity of spot tin has been pressed for sale at 60.50c., with difficulty experienced in making the transaction. The quotation yesterday was 60.50c., New York, but the entire market is at a standstill. Arrivals including Oct. 2 were 60 tons, with the quantity afloat 4500 tons. Deliveries of tin for September were 5402 tons, of which 2100 tons came from Atlantic ports. Metal in stock and landing Sept. 30 was 2390 tons. The London market has declined in the past few days and now stands at £245 10s. for spot Straits.

Lead.—The lead market is steadier and the downward tendency seems to have been checked. Sellers are apparently anxious for orders, but seem unwilling to make concessions. A modest business has been done at 8c., New York, which is the quotation of the leading interest, but it is reported that concessions have been made on large lots. The quotation in the outside market remains unchanged at 7.95c., New York, and 7.82½c., St. Louis. It is reported that some export sales have been made and it is believed that they are large, but no particulars are available. An interesting explanation of the recent large decline in lead is that pig lead had to come down to at least the present level

in order to save the white lead industry because of the reported inroads by substitutes for lead in the manufacture of paint.

Spelter.—Since last week the market has become weaker if anything. The moderately active inquiry and buying which appeared about two or three weeks ago has given place to extreme dullness. Most large producers adhere to the previous quotation of 8.25c., St. Louis, but sales have been made slightly lower at 8.12½c., St. Louis, or 8.37½c., New York, which are now regarded as the quotations. For November-December delivery about ¼c. to ½c. higher is asked. On Sept. 27 the Government awarded its contract for 1000 tons of grade B spelter (99.50 per cent zinc) on which competitive bids had been asked. The American Metal Co., the lowest bidder, received the award at 10.67c. Other bids ranged from 11c. to 12.12½c. Early in September the Government fixed 12c. per pound as the price on 2,750,000 lb. of this grade of spelter, but canceled the order in order to buy in the open market. This sale at 10.67c. has weakened rather than strengthened the market. The Government is also asking for bids on 320 tons of prime Western.

Antimony.—The market continues dull. Chinese and Japanese grades are obtainable at 15c. to 15.25c. per pound, New York, duty paid.

Aluminum.—No. 1 virgin metal, 98 to 99 per cent pure, is still quoted at 41.50c. to 42.50c. per pound, New York, but there is no demand and the market is nominal.

Old Metals.—We are quoting copper nominally on the basis of the Government regulation, but it is impossible to purchase heavy crucible copper at less than 26½c. to 27c. per pound. We quote dealers' selling prices as follows:

	Cents per lb.
Copper, heavy and crucible (nominal).....	23.50
Copper, heavy and wire (nominal).....	23.50
Copper, light and bottoms.....	22.50 to 23.50
Brass, heavy	18.00 to 18.25
Brass, light	14.00 to 14.25
Heavy machine composition.....	25.00 to 25.50
No. 1 yellow rod brass turnings.....	17.25
No. 1 red brass or composition turnings.....	19.00 to 21.00
Lead, heavy	7.50
Lead, tea	6.50
Zinc	6.50

Chicago

OCT. 1.—There is no real market for copper, although a little is changing hands to satisfy urgent melting needs at prices ranging from 27c. to 29c. Innumerable small consumers find, to their disappointment, that they cannot get the red metal at or near the Government price of 23.50. The fact is that dealers themselves cannot get it at that figure. All of the other metals are correspondingly dull. The demand for old metals is quiet also, despite the natural belief that the scarcity of virgin copper should create a good demand for remelting scrap. We quote as follows: Casting, Lake and electrolytic copper, 27c. to 29c.; tin, carloads, 61.50c.; small lots, 63.50c. to 64.50c.; lead, 8.25c. to 8.50c.; spelter, 8.25c.; sheet zinc, 19c.; antimony, 17c. to 18.50c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 22c.; copper clips, 21.50c.; copper bottoms, 20.25c.; red brass, 21c.; yellow brass, 15.50c.; lead pipe, 6.75c.; zinc, 6.25c.; pewter, No. 1, 35c.; tinfoil, 42c.; block tin, 47c.

St. Louis

OCT. 1.—Non-ferrous metals have been rather quiet during the week and the closing quotations to-day were: Lead, 7.85c. to 7.92½c.; spelter, 8.25c. to 8.37½c.; tin, 62½c.; copper nominal because of the price-fixing situation, which has not been adjusted as to the St. Louis market; Asiatic antimony, 16c. In the Joplin district, ores were rather quiet, zinc blende selling on a range of \$65 to \$75 per ton, basis of 60 per cent metal, but the bulk of the ore of the Oklahoma section of the district sold around \$67.50 and this reduced the average for the week for the district to about \$68 per ton. Calamine sold at \$35 to \$42 per ton, basis of 40 per cent metal, with the average for the week for the district \$37 per ton. Lead was rather weak at \$90 per ton, and the average for the 80 per cent metal basis was \$86 per ton.

IRON AND INDUSTRIAL STOCKS

Tightness of the Money Market Checks Upward Movement of Stocks

NEW YORK, Oct. 3.

Following the gains made the first part of last week after the announcement of prices of iron ore, coke, pig iron and some steel products, the market hesitated and during most of the week the tendency was downward. This was not attributed to any industrial condition, but almost entirely to the tightness of the money market. Getting ready to subscribe for the second great Liberty Loan undoubtedly had an influence on the money market which in turn influenced stocks.

Among the stocks which recorded advances were: Baldwin Locomotive, $1\frac{1}{4}$, and Bethlehem Steel, 2. Bethlehem Steel, class B, was active and 262,000 shares changed hands, but the quotation remained the same at the end of the week as at the beginning. The leading stocks which recorded losses during the week were American Car & Foundry, $1\frac{1}{4}$; American Locomotive, $\frac{3}{4}$; American Steel Foundries, $2\frac{1}{2}$; Colorado Fuel & Iron, $1\frac{1}{4}$; Lackawanna Steel, 2; Pressed Steel Car, 4; Republic Iron & Steel, $1\frac{1}{2}$; United States Steel, $1\frac{1}{4}$; United States Steel, pref., $\frac{1}{2}$.

The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.	23 $\frac{1}{2}$ - 25 $\frac{1}{2}$	Lacka. Steel....	80 $\frac{1}{4}$ - 84
Allis-Chal., pref.	82 $\frac{1}{4}$ - 84	Lake Sup. Corp.	16 - 17 $\frac{1}{4}$
Am. Can., com.	42 $\frac{3}{4}$ - 47 $\frac{1}{4}$	Lima Loco.	55
Am. Can., pref.	101 $\frac{1}{2}$ - 102	Lukens, 1st pref.	100 $\frac{1}{2}$
Am. Car & Fdy., com.	70 - 72 $\frac{1}{4}$	Midvale Steel....	50 - 52 $\frac{1}{2}$
Am. Car & Fdy., pref.	109 - 110	Nat.-Acme	32 $\frac{1}{2}$ - 32 $\frac{3}{4}$
Am. Loco., com.	60 - 62 $\frac{1}{4}$	Nat. En. & Stm., com.	42 $\frac{1}{2}$ - 46 $\frac{1}{2}$
Am. Rad., com.	295	N. Y. Air Brake	122 - 124 $\frac{1}{2}$
Am. Ship, com.	90 - 92 $\frac{1}{2}$	Pressed Stl., com.	60 - 63 $\frac{1}{4}$
Am. Steel Fdries.	65 - 67	Pressed Stl., pref.	100
Bald. Loco., com.	61 $\frac{1}{2}$ - 65 $\frac{1}{2}$	Ry. Steel Spring, com.	46 - 48
Bald. Loco., pref.	99 $\frac{1}{2}$ - 109 $\frac{1}{2}$	Ry. Steel Spring, pref.	97 - 97 $\frac{1}{4}$
Beth. Steel, com.	95 - 96 $\frac{1}{2}$	Republic, com.	79 $\frac{1}{2}$ - 83 $\frac{1}{4}$
Beth. Steel, class B	91 $\frac{1}{4}$ - 95 $\frac{1}{2}$	Republic, pref.	100 $\frac{1}{2}$
Case (J. I.), pref.	80	Sloss, com.	45 - 46
Central Fdy., com.	40	Sup. Steel	44 - 47
Chic. Pneu. Tool.	61 - 62	Sup. Steel, 1st pref.	100 $\frac{1}{2}$
Colo. Fuel	44 $\frac{1}{4}$ - 45 $\frac{1}{4}$	Transue-Williams	41 - 41 $\frac{1}{2}$
Cruc. Steel, com.	69 $\frac{3}{4}$ - 73 $\frac{1}{2}$	Un. Alloy Steel.	43 $\frac{1}{4}$ - 44
Cruc. Steel, pref.	94 $\frac{1}{2}$ - 95	U. S. Pipe, com.	16 $\frac{1}{2}$
Gen. Electric....	138 - 147	U. S. Steel, com.	107 $\frac{1}{2}$ - 112 $\frac{1}{2}$
Gt. No. Ore. Cert.	33 - 35 $\frac{1}{4}$	U. S. Steel, pref.	115 $\frac{1}{2}$ - 117 $\frac{1}{2}$
Gulf States Steel	95 $\frac{1}{4}$ - 99	Va. I. C. & Coke	59 - 60
Int. Har. of N. J., com.	109 $\frac{1}{4}$ - 112	Warwick	9
Int. Har. Corp., pref.	70	Westing. Elec....	45 $\frac{1}{2}$ - 47

Dividends

The American Shipbuilding Co., quarterly, $1\frac{1}{2}$ per cent on the common and $1\frac{1}{4}$ per cent on the preferred, both payable Nov. 1.

The Atlantic Steel Co., quarterly, $1\frac{1}{2}$ per cent and extra 1 per cent, payable Oct. 2.

The E. W. Bliss Co., quarterly, 62 $\frac{1}{2}$ c. and extra \$5.62 $\frac{1}{2}$ on the common and \$1 on the preferred, all payable Oct. 1.

The Canadian Crocker-Wheeler Co., Ltd., quarterly, $1\frac{1}{4}$ per cent on both the common and preferred, payable Oct. 1.

The Chicago Pneumatic Tool Co., quarterly, 1 per cent, payable Oct. 25.

The Lukens Steel Co., quarterly, $1\frac{1}{4}$ per cent on the first and second preferred, payable Oct. 15.

The National Tool Co., quarterly, 3 per cent on the common and $1\frac{1}{4}$ per cent on the preferred, payable Oct. 1.

The Otis Elevator Co., quarterly, $1\frac{1}{4}$ per cent on the common and $1\frac{1}{2}$ per cent on the preferred, payable Oct. 15.

The Pittsburgh Steel Co., quarterly, 2 per cent on the common, payable Oct. 1.

The Scovill Mfg. Co., quarterly, 2 per cent and extra 10 per cent, payable Oct. 1.

The Superior Steel Corporation, quarterly, $1\frac{1}{2}$ per cent on the common, payable Nov. 1.

The Westinghouse Air Brake Co., quarterly, \$1.75, payable Oct. 20.

The Westinghouse Electric & Mfg. Co., quarterly, 1% per cent on the common, payable Oct. 31, and $1\frac{1}{4}$ per cent on the preferred, payable Oct. 15.

The Detroit Iron & Steel Co., $2\frac{1}{2}$ per cent and extra 5 per cent on the common, payable Oct. 5.

The Westinghouse Electric & Mfg. Co., Pittsburgh, has begun work in its new airplane department at Swissvale, Pa., on a contract for airplane engines, which is said to amount to \$17,500,000. The company is expected to make 600 engines a month. It is announced that the company will also soon manufacture hand grenades for the Government.

LICENSE NOT REQUIRED

Articles Which May Be Freely Exported Except to Territory Specified

WASHINGTON, Oct. 2.—A long list of articles, including many iron and steel products, has been announced by the Exports Administrative Board as not requiring an export license when the foreign destination is other than enemy territory or neutral territory of Europe. This is the first time the board has attempted to list specifically articles which do not require license. Feeling that this negative list, as it might be called, will be of great assistance to our export trade to many foreign countries, the board has announced its intention of keeping it up to date from time to time.

In conjunction with the publication of the list the board made the following announcement:

"The board has determined that under the President's proclamation of Aug. 27, 1917, the following articles do not require an export license at present except when shipped to Albania, Austria-Hungary, that portion of Belgium occupied by the military forces of Germany, Bulgaria, Denmark, her colonies, possessions or protectorates, Germany, her colonies, possessions or protectorates, Greece, Liechtenstein, Luxembourg, the Kingdom of The Netherlands, Norway, Spain, her colonies, possessions or protectorates, Sweden, Switzerland or Turkey (excluding any portion of the foregoing occupied by the military forces of the United States or the nations associated with the United States in the war), or any territory occupied by the military forces of Germany or her allies.

"The board has further determined that if any of these articles are subsequently classified as requiring a license, nevertheless they will in general be allowed to proceed without license when covered by ocean bill of lading or by railroad bill of lading marked 'For Export,' dated on or before the date classified. There may, of course, be some special instances where for certain reasons the embargo will have to be effective immediately, regardless of when the goods were shipped, but these cases will be rare and special attention will be called to them at the time publicity is given to the fact that they have been classified as requiring a license. All future classification lists will give the date of classification and will be given publicity so as to minimize any question in the minds of shippers or carriers as to what articles do and what articles do not require a license."

The list includes the following:

Adding machines, addressograph machinery, agricultural tools, air compressors and parts, automobiles and parts, axes, axles (wagon).

Balata sheets (used for insulating), baling press (steel), ball bearings, barbed wire, bars, iron or steel (except tool steel, high speed steel or alloy steel), bicycle supplies, blades (hacksaw), blowers and parts, boilers (range) for household purposes only, bolts, bolt clippers, brake shoes, builders' hardware.

Calipers, carriage hardware, channel pins, chucks, cobblers' tools, compressors, countersinks, crane chain, cutlery, die plates, dredging buckets (iron), driving chain.

Elevator repair parts, elevator machinery, enamel, files (except abrasive files), filing cabinets (metal), forges and accessories.

Galvanized wire, galvanized tiller rope, gas machines and fixtures, gas pipe, grate bars, gas tubes, grate bars (locomotive).

Hammers and hatchets, hand power cranes, harvester parts, hinges, hoops, steel, hydrometers, hygrometers.

Injectors, iron band, iron bars, iron castings, iron hose fittings, irons (flat), iron oil separators, iron pipe fittings, iron pipe, iron plates or sheets under $\frac{1}{4}$ in. thick, iron rivets, iron valves, iron wire.

Jacks.

Keys.

Lawn mowers, linotype machines and parts, locomotive grate bars.

Machinery: cigarette, knitting, perforating, except for metal, mining, wool cleaning, refrigerating, enameling, braiding (for electrical wire), match making, shoe, winding, paper making, paper box, stump pulling, pharmaceutical, printing, concrete, paper wrapping, washing, sugar, stenciling, filters and parts, duplicating, cotton gin, tobacco, molding; mangle

roller blocks, malleable iron steam pipe fittings, metal fasteners, metal picture frames, metal valves, mills (grist), motor-cycles.

Nails, nail wire, needles and awls.

Pipe (galvanized), plows, precision tools (hand), printing machinery, printing presses, pump jacks, pyrometers.

Radiators, rail (steel), railroad cars, railroad picks, range boilers, razor blades, rivets (iron), roofing (galv. iron, including sheets less than $\frac{1}{8}$ in. thick).

Saw blades, screws, screw caps, screwdrivers, sewing machines, shears (hand), sheets (iron or steel under $\frac{1}{8}$ in. thick), shoes (horse), shovels, slot machines, spark plugs, splice bars, sprockets, steam locomotives, stitching machine wire, stocks and dies, strap iron, surgical instruments, stoves, steel anvils, steel balls, steel bars (except tool steel, high speed steel or alloy steel), steel belt laces, steel (cold rolled), steel cabinets, steel forgings, steel grease cups, steel hanger frames and bearings, steel hoists, steel molding, swings, steel padlocks, steel pipe, steel plates or sheets under $\frac{1}{8}$ in. thick, steel pulleys, steel rails, steel sash, steel shaft, steel spring cotters, steel tires for locomotives, steel wire, strap iron, steel wire cloth, steel wheel push cars, strontium bromide.

Taps and dies (if for hand use), tools (carpenters', shoe-makers', steamfitters'), track bolts, tractors (farming), trailers (motor), trucks, turnbuckles (except for aircraft), type-cases (printers'), typewriters, typewriter parts.

Umbrella ribs and tubes.

Valves, valve gages, gate valves, valve wheels, vises.

Water meters, water heaters, water gates, wheelbarrows, wheel hubs, wheels (car), wire (fencing, plain, cloth, galvanized, netting), wire stitchers, wrenches.

PERSONAL

James A. Morris, formerly in the auditing department of the Brier Hill Steel Co., Youngstown, Ohio, has resigned to accept a position in the auditing department of the Inland Steel Co., Chicago. Mr. Morris was connected with the Inland Steel Co., several years ago, and later he was in the auditing department of the William Tod Co., Youngstown, Ohio, now owned by the United Engineering & Foundry Co., Pittsburgh.

Frank Purnell, in the sales department of the Youngstown Sheet & Tube Co., Youngstown, has accepted a position with the Priorities Committee in Washington, where he will be closely associated with J. Leonard Replogle in the purchase of steel and munitions for the Government.

L. M. Zimmer, formerly in the sales department of the Linde Air Products Co., New York, has been promoted and transferred to the Cincinnati office. The new branch plant of the Linde company in Cincinnati is now in full operation.

Harold A. Robinson, formerly mechanical engineer of the Regal Gasoline Engine Co., Seattle, Wash., has been made superintendent of the company in place of E. E. Funk, who died a month ago.

Charles W. Schneck, who established the Schneck Machine Co., 809-811 St. Paul Avenue, Milwaukee, in 1893, has disposed of the plant and business to the Western Rope & Mfg. Co., Tulsa, Okla., and will take a long rest before resuming active business connections. Mr. Schneck will leave Oct. 15 on an extended tour of the country for the benefit of his health.

Max E. Biefeld, Watertown, Wis., has resigned as assistant manager of the American Malting Co. to become secretary-treasurer of the Otto Biefeld Co., Watertown, boiler and structural works, succeeding the late Richard Biefeld.

Charles Hart of the Delaware River Steel Co., has been elected a director of the Chester National Bank, Chester, Pa.

W. M. Kelly, for the past three years acting general foreman at the erecting shops of the Pennsylvania Railroad, Altoona, Pa., has been appointed resident inspector of trial devices for locomotives and other apparatus in the Philadelphia district, effective Oct. 1.

T. H. Letson, for 17 years sales manager in New York for the American Hoist & Derrick Co., St. Paul, Minn., who on May 1 last severed his connection with that company, has organized the T. H. Letson Co. and

opened an office at 50 Church Street, New York, for the handling of hoisting and power machinery and contractors' equipment. Frederick Glander, electrical and mechanical engineer, is associated with Mr. Letson in the new business.

N. C. Walpole, Southern sales manager of the Niles-Bement-Pond Co. and the Pratt & Whitney Co., with offices in Birmingham, Ala., has been granted leave of absence for the duration of the war, and has been commissioned major in the Ordnance Department.

Christian Girl, president of the Standard Parts Co., Cleveland, Ohio, has been appointed by the Government to supervise the construction of the 40,000 Liberty trucks that are to be built for the War Department. He will remain at the head of the Standard Parts Co., but has been given a leave of absence in order to devote his time to Government service.

O. W. Black has been appointed works manager of the Fulton Iron Works Co., St. Louis, to succeed Laurence W. O'Neil, resigned. Mr. Black was for many years associated with the Republic Iron & Steel Co. For the last few years he has been works manager of that company's East Chicago plant, having had prior to that charge of its Mahoning Valley works.

Louis W. Carver, for the past two years purchasing agent for the Chester Shipbuilding Co., Chester, Pa., has become associated with the Purchasing Board of the United States Shipping Board.

Werner Anderson, New England sales agent for the Alden Coal Mining Co., has been recommended and accepted for service in the aviation branch of the U. S. Signal Corps, Mineola, L. I.

H. W. Haggerty, who has had charge of the pig iron and steel sales of Corrigan, McKinney & Co., Cleveland, has been made general manager of sales of that firm and appointments of other department heads have been made as follows: A. J. Sweeney, general manager of transportation; P. H. Owen, purchasing agent, and F. T. McCrackin, manager of the shipping department. The appointments were made to centralize authority in the different departments.

Warren W. Baker, president, and Francis S. Carr, vice-president, Pennsylvania Steel Export Co., Philadelphia, left Wednesday for Vancouver, B. C., from which port they will sail on the steamship Empress of Japan on Oct. 11 for Japan, where they will open a branch office for their company. Mr. Baker will return in January, but Mr. Carr will remain from four to six months. Philadelphia offices of the company will be removed from the Finance Building to the Widener Building.

Samuel A. Benner on his withdrawal as general sales manager of the American Steel Export Co. to become vice-president of the Federal Export Corporation was presented with a gold cigar case by the company and an ebony cane by the employees.

Frank B. Gilbreth, consulting management engineer, Providence, R. I., has been commissioned a major in the ordnance department of the U. S. Army and is to have charge of some features of construction work of the railroad which the United States is to build in France.

Major George D. Babcock, Ordnance, U. S. A., has arrived in Europe where he is in charge of ordnance supplies for the American forces in France. He is on an indefinite leave of absence from the H. H. Franklin Mfg. Co., Syracuse, N. Y., where he was production manager, and in which city he organized a branch of the National Metal Trades' Association.

Theodore L. Wagner, foreman, Stanley Works, New Britain, Conn., has resigned to become superintendent of the Stanford Steel Products Co., Milford, Conn.

John Kenney, who recently resigned at the American plant, Bethlehem Steel Co., Lebanon, Pa., has accepted a position as assistant superintendent of the Standard Iron and Steel Co., Burnham, Pa.

Robinson F. Walter, Lebanon, Pa., has been appointed chief chemist at the Prussiate plant of the Semet-Solvay Co., Cleveland. Mr. Walter is a graduate of Lehigh College, class of 1917.

Dr. Floyd Shaffer, one of the surgeons of the Bethlehem Steel Co. at the Bethlehem, Pa., plant, has been

commissioned a first lieutenant in the Medical Officers' Reserve Corps.

New Company to Make Silico-Manganese and Carbon Electrodes

A new company on the Pacific coast will soon be a producer of silico-manganese and of carbon electrodes. The Pacific Electro Metals Co., located at Bay Point, on San Francisco Bay, announces plans for producing also ferromanganese, ferrotungsten, ferromolybdenum and ferrochromium. The principal alloy made will be silico-manganese, containing 60 per cent manganese, 20 per cent silicon and 20 per cent iron. It is stated that the carbon content will be less than 0.50 per cent, with the sulphur below 0.02 per cent and the phosphorus under 0.025 per cent. This alloy was imported from England previous to the war.

Features of the carbon electrodes which will be produced are that they will be partly graphitized, that they will contain not over 1 per cent of ash and that their current density will be 60 amperes per sq. in. The company states that these will sell at the same price in the Eastern markets as other carbon electrodes.

The initial installation of the plant consist of two 3000-kw. furnaces for the production of silico-manganese and ferromanganese and three 300-kw. furnaces for the production of ferrotungsten, molybdenum and chromium. A third 3000-kw. furnace is to be in operation in January. The present installation at five furnaces will start operations some time between Oct. 15 and Nov. 1. The buildings are of reinforced concrete and the plant, occupying 55 acres, is located at tide-water with facilities of three transcontinental railroads. The Beckman & Linden Engineering Corporation, Balboa Building, San Francisco, is the engineer and manager of the new company.

Machinery Trade to Aid Liberty Loan

The Machinery and Machine Tool Trades Committee of the Liberty Loan Committee of New York has been organized and J. W. Lane, president of the E. W. Bliss Co., Brooklyn, was appointed chairman for Greater New York. Chairman Lane called together the following men to co-operate with him:

Henry Prentiss, president Prentiss Tool & Supply Co., 149 Broadway; George Doubleday, president Ingersoll-Rand Co., 11 Broadway; R. L. Patterson, president American Machine & Foundry Co., 511 Fifth Avenue; C. I. Cornell, treasurer Pratt & Whitney Co., 111 Broadway; Henry Fuller, vice-president Fairbanks-Morse Co., 30 Church Street; John H. Lidgerwood, president Lidgerwood Mfg. Co., 96 Liberty Street; A. J. Babcock, president Manning, Maxwell & Moore, Inc., 119 West Fortieth Street; Norman Dodge, vice-president Mergenthaler Linotype Co., Tribune Building; H. R. Swartz, president Intertype Corporation, 63 Park Row; George J. Low, F. M. Dyer & Co., 24 Broad Street; Charles A. Hirschberg, publicity manager Ingersoll-Rand Co., 11 Broadway.

The committee held its first meeting on Friday, Sept. 28, and elected H. R. Swartz, vice-chairman, and George J. Low, secretary, and appointed Charles A. Hirschberg publicity member. The committee has established headquarters on the sixteenth floor, 334 Fourth Avenue, and manufacturers of machinery and machine tools, as well as their employees, are asked to communicate with the secretary at that address for full information, subscription blanks and other material.

The Bowen Anchor Co. has begun the construction of a new plant at Morton, Pa., for making steel anchors for the United States Government. The following buildings are being erected: Foundry, 90 x 200 ft.; one-story pattern shop, 25 x 75 ft.; two-story office building, 25 x 45 ft. The foundry will be equipped with a 20-ton open-hearth steel furnace and will be prepared to manufacture steel anchors of all sizes. The plant will be in operation about Dec. 1 and 200 men will be employed. George W. Bowen, Swarthmore, Pa., is president of the company, which is capitalized at \$500,000.

The Delays in Rifle Manufacture

WASHINGTON, Oct. 2.—The work of standardizing the equipment of the three factories of the Remington and Winchester companies engaged in producing Lee-Enfield rifles for the army, so as to secure a satisfactory percentage of interchangeability of parts, has been completed and the arms are now being delivered at the rate of 1300 per day, and will soon reach a daily rate of several thousand. The Committee on Public Information has issued the following statement prepared by General Crozier, chief of the Ordnance Bureau of the War Department:

"My attention has been called to published reports that there is a shortage of rifles at the cantonments and that three rifle manufacturing concerns have been idle during the summer when they might have been engaged in manufacturing rifles.

"These arms companies have not been idle, but have been making extensive preparations for turning out a rifle which would give us both a reasonable degree of interchangeability of important parts and uniform ammunition. Two of them have begun deliveries.

"Two days ago the deliveries of these three factories and the two Government ones were 1200 rifles per day. The deliveries now are more than 1300 per day, and the deliveries will progressively increase. The third company, engaged until recently on British contracts, is practically ready to begin deliveries.

"I may also say that whenever a soldier is ready to go to Europe—that is, when he is trained and equipped in every other way—a modern rifle will be ready for him.

"At the outset of the war it was fully recognized and explained that we could pursue two courses—either experience a perfectly endurable delay and produce a rifle with interchangeable parts to use a standard ammunition, or produce rifles more rapidly but without interchangeability of parts and incapable of using a uniform ammunition.

"By waiting two or three months we have not only obtained a one-ammunition rifle, but a rifle with parts which may be interchanged quickly on the battlefields of Europe and which may be turned out by three factories in this country. The Ordnance Bureau is willing to stand on this basis, inasmuch as every soldier will be supplied a rifle of that type when he starts for France.

"There are now at each of the cantonments 5000 rifles suitable for drilling purposes. A rifle to each man is not imperative for purposes of drill, as the companies can drill at different hours. The main thing is to supply rifles when the trained men are ready to leave, and such rifles will be rapidly turned out now by three factories and two Government factories which have equipped themselves during the summer for the work and can supply the rifles in sufficient numbers at the required time."

OBITUARY

HON. NORMAN HALL, aged 88 years, pioneer pig-iron manufacturer, former member of Congress and active for the past half century in the business affairs of Sharon, Pa., died suddenly Saturday, Sept. 29, from heart disease at his home in that city. Mr. Hall was born at Muncy Farms, Lycoming County, Pa., Nov. 17, 1829. He graduated in 1847 from Dickinson College, and in 1851 located at Marietta, Ohio, where he was connected with a blast furnace. He later engaged in iron ore mining at Becks County, Pa. He next became interested with Boyce, Rawls & Co. at Sharon in the operation of the Hall furnace. He was engaged in the iron trade for over 40 years. In 1886 Mr. Hall was elected to Congress from the twenty-sixth district composed of Mercer, Crawford and Butler counties, carrying the district usually Republican on the Democratic ticket.

The Colts Patent Firearms Mfg. Co., Hartford, Conn., is reported to have purchased the Meriden, Conn., plant of the New England Westinghouse Co.

PRODUCTION FALLING.

September Pig Iron Output 3,133,954 Tons.

The Rate was 104,465 Tons a Day Against 104,772 Tons in August.

The rate of pig-iron production fell off slightly in September, the total for the 30 days of that month as reported to THE IRON AGE being 3,133,954 tons, or 104,465 tons a day, as against 3,247,947 tons in August, or 104,772 tons a day. The furnaces of steel companies increased their daily rate but that of merchant furnaces fell off. A large number of furnaces were compelled to blow out in the month and a smaller number blew in, the net loss being 10 furnaces. We estimate the capacity of the 347 furnaces in blast Oct. 1 at 107,250 tons a day, as compared with 110,165 tons a day for the 357 furnaces in blast Sept. 1. The output of ferromanganese increased to 42,235 tons last month as against 39,492 tons for 31 days in August.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from September, 1916, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
September, 1916	76,990	29,755	106,745
October	81,639	31,550	113,189
November	80,141	30,253	110,394
December	74,264	28,273	102,537
January, 1917	72,394	29,249	101,643
February	65,280	29,193	94,473
March	73,731	31,132	104,863
April	79,031	32,134	111,165
May	77,561	32,677	110,238
June	76,805	32,197	109,002
July	76,440	31,380	107,820
August	71,436	33,336	104,772
September	73,290	31,175	104,465

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces in September and the three months preceding:

Monthly Pig-Iron Production—Gross Tons

	June (30 days)	July (31 days)	Aug. (31 days)	Sept. (30 days)
New York	193,198	194,255	178,841	182,171
New Jersey	14,340	18,990	21,315	25,169
Lehigh Valley	114,465	116,432	111,583	110,418
Schuylkill Valley	94,097	94,578	91,236	75,727
Lower Susquehanna and Lebanon Valley	79,989	84,540	88,295	84,758
Pittsburgh district	651,768	664,456	664,141	638,611
Shenango Valley	171,074	174,614	164,709	140,205
Western Pennsylvania	202,145	215,192	213,731	211,513
Maryland, Virginia and Kentucky	99,238	89,603	83,233	90,466
Wheeling district	125,403	129,689	124,627	118,195
Mahoning Valley	307,829	322,165	300,740	309,570
Central and Northern Ohio	278,396	299,458	272,109	271,519
Hock. Val., Hang. Rk. & S. W. Ohio	60,866	55,186	59,577	62,499
Chicago district	489,780	503,946	503,723	457,330
Mich., Minn., Mo., Wis. Col. and Wash.	118,109	114,952	105,486	108,325
Alabama	234,259	231,738	232,355	222,687
Tennessee and Ga.	35,099	32,644	32,246	24,791
Total	3,270,055	3,342,438	3,247,947	3,133,954

The list of furnaces blown in in September includes one Susquehanna at Buffalo, one Farrell in the Shenango Valley, Punxsutawney in western Pennsylvania, Oriskany (Oct. 1) and one Virginia Iron, Coal & Coke in Virginia, one Bellaire in the Wheeling district, Irondale in Washington and Oxmoor in Alabama. Among furnaces blown out was one Susquehanna at Buffalo; Delaware River, Keystone and one Swede in the Schuylkill Valley; one Colebrook in the Lebanon Valley; one Donora, one Duquesne, one Edgar Thomson and one Monongahela in the Pittsburgh district; Claire and two New Castle in the Shenango Valley; one Bethlehem at Sparrows Point, one Mingo in the Wheeling district, one Wellston in the Hanging Rock district, one Clifton in Alabama, and Cumberland and La Follette in Tennessee.

Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of steel-making iron month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Pig. total production			Spiegeleisen and ferromanganese		
	1915	1916	1917	1915	1916	1917
Jan.	1,115,944	2,251,035	2,244,203	18,041	24,866	38,792
Feb.	1,237,380	2,183,845	1,829,846	13,319	23,877	32,137
Mar.	1,551,082	2,365,116	2,285,430	12,274	29,388	36,563
Apr.	1,584,111	2,316,768	2,370,937	12,337	31,862	39,595
May	1,694,290	2,408,890	2,404,380	13,440	35,844	37,701
June	1,770,657	2,295,784	2,304,155	19,200	38,597	39,829
July	1,949,750	2,306,303	2,369,630	17,854	31,353	43,884
Aug.	2,101,818	2,313,122	2,214,513	27,463	33,338	39,492
Sept.	2,129,322	2,309,710	2,198,705	23,159	29,451	42,235
Oct.	2,281,456	2,530,806	.....	23,992	34,566	.....
Nov.	2,198,459	2,404,210	.....	28,741	44,975	.....
Dec.	2,283,047	2,294,620	.....	25,004	43,470	.....

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1913—Gross Tons

	1913	1914	1915	1916	1917
Jan.	2,795,331	1,885,054	1,601,421	3,185,121	3,150,938
Feb.	2,586,337	1,888,670	1,674,771	3,087,212	2,645,247
Mar.	2,763,563	2,347,867	2,063,834	3,337,691	3,251,352
Apr.	2,752,761	2,269,655	2,116,494	3,227,768	3,334,960
May	2,822,217	2,092,686	2,263,470	3,361,073	3,417,340
June	2,628,565	1,917,783	2,380,827	3,211,588	3,270,055
July	2,560,646	1,957,645	2,563,420	3,224,513	3,342,438
Aug.	2,545,763	1,995,261	2,779,647	3,203,713	3,247,947
Sept.	2,505,927	1,882,577	2,852,561	3,202,366	3,133,954
9 mo.	23,961,110	18,237,198	20,296,445	29,071,045	28,794,231
Oct.	2,546,261	1,778,186	3,125,491	3,508,849	.....
Nov.	2,233,123	1,518,316	3,037,308	3,311,811	.....
Dec.	1,983,607	1,515,752	3,203,322	3,178,651	.....
Total, yr.	30,724,101	23,049,752	29,662,566	39,039,356	.....

The figures for daily average production, beginning January, 1910, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1910—Gross Tons

	1910	1911	1912	1913	1914	1915	1916	1917
Jan.	84,148	56,752	66,384	90,172	60,808	51,659	102,746	101,643
Feb.	85,616	64,090	72,442	92,369	67,453	59,813	106,456	94,473
Mar.	84,459	70,036	77,591	89,147	75,738	66,575	107,667	104,882
Apr.	82,792	68,836	79,181	91,759	75,665	70,550	107,592	111,165
May	77,102	61,079	81,051	91,039	67,506	73,015	108,422	110,238
June	75,516	59,585	81,358	87,619	63,916	79,361	107,053	109,002
July	69,305	57,841	77,738	82,601	63,150	82,691	104,017	107,820
Aug.	67,963	62,150	81,046	82,057	64,363	89,666	103,346	104,772
Sept.	68,476	65,903	82,128	83,531	62,753	95,085	106,745	104,465
Oct.	67,520	67,811	86,722	82,133	57,361	100,822	113,189	.....
Nov.	63,659	66,648	87,697	74,453	50,611	101,244	110,394	.....
Dec.	57,349	65,912	89,766	63,987	48,896	103,333	102,537	.....

Diagram of Pig-Iron Production and Prices

The fluctuations in pig-iron production from January, 1909, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production by months of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of THE IRON AGE.

Blast Furnace Notes

A second Iroquois furnace at South Chicago, Ill., is now in charge of the Miami Products Co., which will operate it in the production of ferromanganese. The expectation is that the furnace the Miami Products Co. has been operating for some time will be blown out for relining.

The Bird Coal & Iron Co. expects to blow in its furnace at Talladega, Ala., about Nov. 1. The improvements and repairs now under way consist of new trestle work and ore bins, and for the coke ovens new coal bins and conveyors. The boiler plant has been remodeled. By raising the furnace to a height of 80 ft. and by other changes the capacity has been brought up to 200 tons a day. The output of the coal mines will be increased from 150 tons to 700 tons per day. Work at the brown ore and red ore mines will put them in position to supply all the ore needed.

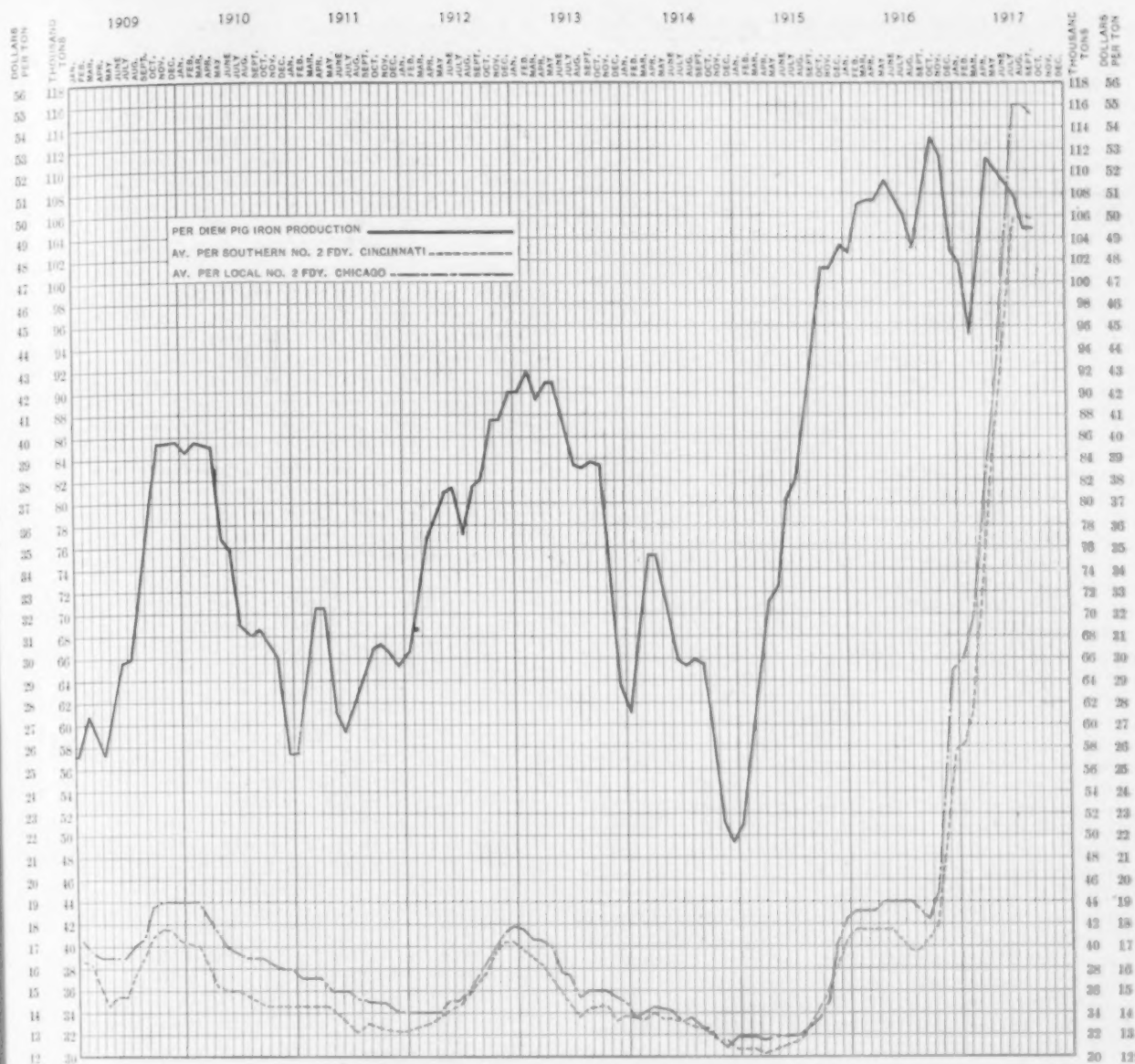


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from Jan. 1, 1908, to Oct. 1, 1917; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

Smoke Prevention Meeting at Columbus

The twelfth annual convention of the National Smoke Prevention Association was held at the Hotel Deshler, Columbus, Ohio, Sept. 25, 26 and 27, President William H. Reid, Chicago, presiding. The attendance was larger than at any previous convention and the discussions on the different papers active. The association passed resolutions recommending that while the United States Government regulates through a fuel commissioner the quantity of fuel allotted to the various industries of the country, "the supply of fuel be further conserved by the appointment of a federal fuel conservator in each State to regulate the consumption and burning of fuel."

The association offers the services of the trained combustion experts employed in the various smoke departments of the country and other combustion expert members of the association to assist in this work of fuel conservation, and it voted that a committee consisting of William H. Reid, president, W. L. Robinson, second vice-president, and W. A. Pittsford, be instructed by the association to confer with the proper government authorities and urge them to take such action as will carry out the spirit of this resolution.

The following officers were elected to serve during the ensuing year: President, William H. Reid, re-elected; first vice-president, Daniel Maloney, Newark, N. J.; second vice-president, W. H. Corbet, Michigan City, Ind., and secretary and treasurer, Frank A. Chambers, Chicago, re-elected. The association will hold its next annual convention at Newark, N. J.

Proposed Merger of Acetylene and Electric Battery Companies

A plan has been submitted to the stockholders for the merging of the National Carbon Co., the Union Carbide Co., Linde Air Products Co. and the Prest-O-Lite Co., into a new corporation with 3,000,000 shares of no-par stock. Under the plans, the new company will be known as the Union Carbide & Carbon Corporation, and will have plants in many parts of the country. The new company will have a large number of products, including calcium carbide, acetylene gas, machinery for gas production, electric batteries and other electric appliances, acetylene blow torches and automobile equipment. Myron T. Herrick, Cleveland, will be chairman of the board of directors; George O. Knapp, now president of the Carbide Co., president; J. S. Crider, Edgar Price and M. J. Carney, vice-presidents; H. E. Hackenberg, secretary, and Giles W. Mead, treasurer and vice-president.

Buildings will be erected seven miles from Jacksonville, Fla., similar to those at Army cantonments, as a training camp for newly appointed officers of the Quartermasters' Corps. The A. Bently Co., Toledo, Ohio, has received the contract for buildings. The camp will cost about \$2,300,000.

The foundry of the Morency-Van Buren Brass Co., Sturgis, Mich., was destroyed by fire; loss, \$35,000. It will be rebuilt larger than before.

WAR REVENUE BILL PASSED

Income Tax Provisions Follow Closely the Senate Provisions

WASHINGTON, Oct. 2.—The war revenue bill, after three weeks in Conference Committee, has been finally agreed to, the report of the conferees adopted by the House and Senate and the measure will speedily be signed by the President. Practically all the new provisions of the bill of importance to the business community go into effect at once; in fact, the income and excess profits taxes as well as several other levies in the bill are retroactive as to the entire calendar year 1917.

The measure, as it becomes a law, will raise approximately \$2,600,000,000, or a full billion dollars more than the draft as originally reported by the Finance Committee. The House members of the conference scored heavily over the Senate conferees, raised numerous rates and forced back into the bill many important items stricken out in the Senate. But for the grave emergency facing the country, the Senate would probably have rejected the conference report and compelled the House to compromise many provisions, but in view of the necessities of the Government and of the prospect for further taxation, the Senate leaders have reluctantly decided to accept the House amendments.

The income tax provisions of the bill as agreed to follow closely those of the original Senate measure. In addition to the taxes now in force, a new normal tax of 2 per cent is levied upon all incomes in excess of \$1,000 for single persons or \$2,000 for married persons. Added to the normal tax are surtaxes which begin with one per cent upon the amount by which the total net income exceeds \$5,000 and does not exceed \$7,500. The additional surtaxes are as follows: \$7,500 to \$10,000, two per cent; \$10,000 to \$12,500, 3 per cent; \$12,500 to \$15,000, 4 per cent; \$15,000 to \$20,000, 5 per cent; \$20,000 to \$40,000, 7 per cent; \$40,000 to \$60,000, 10 per cent; \$60,000 to \$80,000, 14 per cent; \$80,000 to \$100,000, 18 per cent; \$100,000 to \$150,000, 22 per cent; \$150,000 to \$200,000, 25 per cent; \$200,000 to \$250,000, 30 per cent; \$250,000 to \$300,000, 34 per cent; \$300,000 to \$500,000, 37 per cent; \$500,000 to \$750,000, 40 per cent; \$750,000 to \$1,000,000, 45 per cent; exceeding \$1,000,000, 50 per cent.

Corporations will pay an income tax of 4 per cent in addition to the 2 per cent provided by existing law.

The excess profits tax provisions of the revenue bill were completely recast by the Conference Committee. The original project of employing the English system on which to figure the amount of income subject to this tax was practically abandoned and an untried compromise system substituted. Under the plan adopted, the net profits of a corporation for the taxable year are subject to a deduction of from 7 to 9 per cent of the actual invested capital, the exact percentage depending upon the profits during the pre-war period, including the calendar years 1911, 1912 and 1913. A special exemption of \$3,000 is also allowed. The profits left after these deductions are subject to the following scale of taxes:

On profits in excess of the deduction but not in excess of 15 per cent of the invested capital for the taxable year, 20 per cent; in excess of 15 per cent and not in excess of 20 per cent, 25 per cent; in excess of 20 per cent and not in excess of 25 per cent, 35 per cent; in excess of 25 per cent and not in excess of 33 per cent, 45 per cent; and in excess of 33 per cent, 60 per cent.

As a concrete illustration of the operation of the excess profits tax, a corporation may be taken having a capital of \$100,000, which earned an average of \$20,000 per annum during the pre-war period and will earn a similar amount during the calendar year 1917. As the profits of this concern during the pre-war period exceeded 9 per cent, the law will allow a maximum deduction of 9 per cent, which may be taken from the profits of the current year to fix the amount of taxable income. This leaves \$11,000 subject to tax less the \$3,000 exemption, or \$8,000 net. As the earnings for the taxable year 1917 amount to 20 per cent of the

capital, this corporation falls within the second "bracket" of the above schedule, which provides a tax rate of 25 per cent and which applied to \$8,000 produces a tax of \$2,000.

A new feature of the bill as framed by the conferees subjects all professions and occupations as well as every variety of commercial business to the operation of the excess profits tax and it is stipulated that where an individual follows a profession or occupation which does not involve the use of capital, he shall pay a flat rate of 9 per cent of all his earnings in excess of \$6,000 per annum. This feature of the bill is counted upon to produce a very large sum which cannot be estimated, as the Government is without any data on the subject. The provision will very materially increase the income tax of every citizen following an occupation of any kind whose earnings exceed the exemption provided.

Important changes were made by the Conference Committee in the schedule of taxes on facilities furnished by public utilities. Under this provision, a tax of 3 per cent is levied upon all amounts paid for the transportation of freight by rail or water, and a tax of one cent for each 20 cents or fraction thereof paid on express packages. Parcel post packages, the postage on which amounts to 25 cents or more, will pay a tax of one cent for each 25 cents or fraction thereof. A rate of 8 per cent is levied upon all amounts of transportation paid by persons by rail or water and in addition a tax of 10 per cent of the amount paid for seats, berths, and staterooms in parlor cars, sleeping cars or on vessels. Telegraph, telephone or radio messages for the transmission of which a charge of 15 cents or more is imposed are subject to a tax of 5 cents each.

The sharp contest between the House and Senate as to the method of taxing the automobile industry was finally decided by the conference by imposing a flat levy of 3 per cent upon the selling price of each car, the tax to be paid by the manufacturer. The House originally fixed this tax at 5 per cent and the Senate eliminated it entirely and adopted a graduated scale of taxes to be paid annually by car owners.

Yachts, pleasure boats, power boats, etc., will pay annual taxes at the rate of 50 cents for each foot of length not over 50 feet, \$1 for each foot from 50 to 100 feet, and \$2 for each foot over 100 feet. Motor boats of not over 5 tons with fixed engines will pay a flat rate of \$5.

The controversy as to the taxing of letters and post cards was settled by the conferees, who adopted the House rate of one cent for each letter or post card regardless of the amount of the postage thereon.

By-Product Coke Ovens in United States

One of the interesting features of the National Exposition of Chemical Industries, held at Grand Central Palace, New York, last week, was a large map in the booth of the H. Koppers Co., Pittsburgh, showing the exact number of by-product coke ovens in the United States and their locations. According to the figures compiled by the H. Koppers Co., the total number of by-product coke ovens in the country is now 10,633, of which 6611 have been built since 1908. The annual coal capacity of these ovens is 50,000,000 tons. The Carnegie Steel Co. is building at its Clairton, Pa., works the largest by-product coke plant in the world, having 640 ovens.

The Exposition occupied three floors of Grand Central Palace and was a striking demonstration of the growth of the American chemical industry during the war. Many foundries making castings for chemical plants had exhibits of their products.

Blast Furnaces Wanted for Export

Inquiries have been received in this country for three blast furnaces which can be dismantled and shipped abroad. Two 120-ton furnaces and one 200-ton furnace are wanted.

The Fertil-Dangler-Wilson Co., Cleveland, has removed its general offices from 308 Literary Road to 517 Schofield Building, that city.

GARY EXTENDS WELCOME

Address to Japanese Commission Vigorously Condemns Germany

At the reception tendered the Imperial Japanese Commission by the city of New York, Sept. 28, Judge Elbert H. Gary, chairman of the Mayor's Citizens Committee, extended a welcome to the distinguished visitors, emphasizing the esteem and good wishes which are entertained by the people of the United States for the people of Japan.

Speaking about the war, Judge Gary said that the United States will measure up to all her obligations in this international crisis. "She is mobilizing all the resources of the country for war purposes," he added. "She can, within three or four years, furnish 15,000,000 men, well trained and fully equipped for battle; and she can, within the same time, provide \$100,000,000,000 without crippling her financial strength or interrupting her industrial progress. If necessary, she will do both.

"We have no lives to spare, no money to waste. We would conserve life and property whenever possible within the limits of duty and propriety. But we are happy that, at this particular time, we can be of substantial aid in defense of principles which lie at the foundation of civilization and moral progress. We are serious and sorrowful; yet we are determined and we are not despondent. And we are a united people, almost without exception supporting the President in the endeavor to administer the affairs of Government creditably and impartially. If there are any Americans who, in these days of trouble and peril, are not entirely loyal to our country, or are failing to support the President and his administration, heart and soul, such recalcitrant individuals are and for all time will be, throughout the land, the objects of pity and contempt.

"We insist our ideas are the antitheses of those entertained by the Imperial Government of Germany. If we may rely upon the writings of leading men and the reported performances of the soldiers, apparently approved by the Government, the rulers of the German Empire advocate the doctrine that any aspiration may properly be realized by the exercise of physical power—that might makes right. On the contrary, we believe we are not justified in seeking to acquire anything we desire or need unless the same is supported by the fundamental principles of right and justice.

"Germany proclaims that she is fighting for her life. This is true only in the sense that a bandit is fighting for his life when suddenly overtaken in the attempt to appropriate the property and destroy the life of a law-abiding citizen. Late developments furnish evidence that the Imperial Government of Germany for a considerable period preceding the war was conspiring to violate the rights of weak and inoffensive nations. The tyranny of this enemy of civilization is to be dreaded by the smaller nations; but we have no fear, for we are right and we are strong."

New Departure Field Day

Over 3500 men enjoyed the field day and barbecue of the New Departure Mfg. Co., Bristol, Conn., Sept. 22. The barbecue was the big feature. The New Departure band of 40 pieces and the New Departure chorus of 75 voices entertained with a concert, and there was an interesting flag-raising ceremony. Other features of the field day were a costume parade with five floats and inter-departmental athletic contests, including a ball game and a tug of war. This company is one of the industrial organizations which has been successful in the carrying out of co-operation with its employees and the stimulation of a fine *esprit de corps*.

Motor cylinders for the new Liberty airplane motors will be made of steel tubing. The Ford Motor Car Co., Detroit, is preparing to forge these from the tubing and it is stated expects to be able to turn out the cylinders either rough or finished at the rate of one every five minutes. It is expected that the Ford company will supply a large share of the cylinders in the manufacture of motors.

COMPULSORY WORK LAW

New Maryland Act Attracts Much Attention— Labor Shortage

Country-wide attention is being attracted to Maryland by the new law which compels all men between the ages of 18 and 50 years who are out of employment to register in the Superior Court. The law, which is known as the compulsory work law, is being enforced by George A. Mahone, Baltimore, director of the Compulsory Bureau, and the police. Quite a few arrests have been made, but in most cases the men taken into custody have either gone to work upon being ordered to do so or have produced certificates from their physicians showing that they are physically unfit to work.

One man who refused to accept a position which had been given to him by Director Mahone has been sentenced to 30 days in jail. He has filed an appeal, however. The law will hold until after the war. It was a special war measure passed by the special session of the General Assembly.

Serious Labor Shortage

YOUNGSTOWN, Oct. 2.—As each draft quota leaves Youngstown for Chillicothe, the training camp for the Mahoning county recruits, the labor scarcity prevailing here for some time becomes more acute. With manufacturers paying from \$3.30 to \$3.50 a day for unskilled labor, men are scarce.

By heroic efforts the mill and blast furnace foremen are managing to keep the plants going, many of the good employees agreeing to work overtime to fill vacancies. In the mill offices many young ladies are taking positions formerly held by young men called into the army service.

News of the Labor World

Effective Oct. 1, the Cambria Steel Co. and the Lorain Steel Co., Johnstown, Pa., have advanced the wages of employees at their steel works 10 per cent. About 15,000 men are affected.

About 800 employees at the Ashley, Pa., shops of the Central Railroad of New Jersey, who declared a strike on Sept. 15, returned to work on Sept. 24.

The United States Lock & Hardware Co., Columbia, Pa., has perfected plans to operate as a co-operative company, with provision for every employee of five or more years' continuous service with the company to become interested in the ownership. At the inception of the plan, about 90 men are affected.

Steel Plant Electrical Engineers' Meetings

The Philadelphia section of the Association of Iron and Steel Electrical Engineers has announced a series of meetings to be held at the Majestic Hotel, Philadelphia, as follows:

Oct. 6—"Automatic Telephony as Applied to Industrial Plants," by Thomas C. Thompson, Automatic Electric Co., Chicago.

Dec. 1—"Some Recent Investigations in Arc Welding," by O. H. Eschholz, research division, engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Jan. 5, 1918—"Electrically Operated Bridges," by John C. Reed and Merwyn J. Hocker, electrical engineers, Bethlehem Steel Co., Steelton, Pa.

Feb. 2, 1918—"Mill Type Transformers," by Harry G. Steele, Pittsburgh Transformer Co., Pittsburgh.

March 1, 1918—"Standardized Mill Table Controllers," by John S. Rowan, Rowan Controller Co., Baltimore.

April 6, 1918—"Electricity as Used in Modern Ship Yards," by C. M. Hensen, chief electrician, ship building plant, Bethlehem Steel Co., Sparrows Point, Md.

May 4, 1918—"The Application of Roller Bearings to Cranes," by P. B. Liebermann, chief engineer, Hyatt Roller Bearing Co., Newark, N. J.

Linn O. Morrow, Nineteenth and Hamilton Streets, Philadelphia, is secretary.

Working Out Prices of Steel Products

(Continued from page 833)

or services, or of materials, supplies, or other property of any kind or character; if such agent or employee has any pecuniary interest in such contract or order or if he or any firm of which he is a member, or corporation, joint stock company or association, of which he is an officer or stockholder, or in the pecuniary profits of which he is directly or indirectly interested, shall be a party thereto.

(b) Make or participate in making any recommendations concerning such contract or order to any council, board or commission of the United States or any member or subordinate thereof, without making to the best of his knowledge and belief, a full and complete disclosure in writing to such council, board, commission or subordinate of any and every pecuniary interest which he may have in such contract or order and of his interest in any firm, corporation, company or association being a party thereto. Nor shall he participate in the awarding of such contract or giving of such contract.

"From the foregoing it will be seen," says Director Gifford in promulgating the order, "that in making recommendations regarding contracts or orders, every member, agent or employee interested as defined above, must not only make a written disclosure of his interest to his own committee but also himself disclose such interest in writing to persons or bodies receiving his or his committee's recommendation. Furthermore, the disclosure mentioned in paragraph (b) above must be made whether or not members participate in their committee's recommendations or actions.

"Advising or furnishing information to the director of the Council of National Defense, or the War Industries Board or members thereof does not violate the above quoted section, provided disclosure of interest as herein set out is made, as these bodies are advisory and the members thereof are not contracting officers and do not execute or direct the execution of contracts."

W. L. C.

THE JOBBER'S POSITION

Views of Secretary of American Iron, Steel and Heavy Hardware Association

What may be regarded as an analysis of the steel and iron market situation from the standpoint of the jobber is contained in a circular letter issued by Secretary-treasurer A. H. Chamberlain, Marbridge Building, New York, to the members of the American Iron, Steel and Heavy Hardware Association. In view of the concern shown in some quarters over the position of the middleman in the present era of price fixing, the letter, reprinted in part below, will prove illuminating:

Fixed Prices About Current Mill Average

It is generally agreed that the quotations announced on steel products represent a fair average of the prices recently prevailing on current mill business. In other words, few large or important buyers have had to pay much above the announced prices for material taken into stock except, of course, in the case of special requirements and urgent needs. In studying the distributors' position, it may therefore be assumed that material bought at high prices need not be regarded as raising to any great extent the average cost of stocks on hand. Either it is already placed or the quantity is small and so staple and necessary to working stock that it will readily be disposed of.

Under the conditions which have grown up in the face of the extraordinary special demand now taxing the capacity of mills and factories, it seems hardly probable that protection on material already invoiced or under contract may be expected. It is not unlikely that buyers who have material coming in at higher prices than have been announced are in such need of it that they will be perfectly willing to pay for it and will have no difficulty in selling it at a satisfactory profit. As suggested by THE IRON AGE, "the situation is unlike that of past declines, since buyers who might fail to specify on their contracts cannot now find hungry mills waiting to supply them."

Conditions Tend to Stiffen Jobbers' Prices

No one who is conversant with present conditions at the mills as regards unfilled orders not subject to cancellation, to say nothing of the embarrassments in production arising from transportation difficulties, coal and coke shortage, labor troubles, etc., can possibly look for any general relief in the scarcity of material for months to come. The first general circular issued by the Priorities Committee to all individuals, firms, associations and corporations engaged in the production of iron and steel and in the manufacture of products thereof is summarized in THE IRON AGE, Sept. 27, page 751. It makes very interesting reading and inevitably suggests that jobbers as well as all others purchasing for normal uses are virtually ignored in the calculations and will only come in for what is left after all classes of emergency requirements, including those of England, France, Russia, Italy, Belgium, etc., are fully satisfied. This makes it entirely possible that dearth of available material may easily prevent decline in the value of jobbers' stocks, whatever may be the effect of Government regulation on mill prices.

Numerous attempts to sound the market or purchase at the Government price have proved that leading mills claim that their books are full and they are in no position to accept new business of any kind. I know first hand of a manufacturer requiring 1000 tons of open-hearth steel to complete a Government war order. As soon as the price announcement was made he addressed an inquiry to practically all mills from which the material might be obtained, explaining that he required it immediately for work falling under class A of the Priorities Committee's schedule and asking special consideration and quotations. The best price that could be obtained for service which would in any way satisfy requirements was something over 5c. per pound.

Government Supervision of Labor Seems Necessary

The labor situation is in many respects more critical than ever before in our history. Labor has tasted blood and is virtually running amuck. There seems to be no limit to the demands which employers will be called upon to meet. The contagion has spread to communities removed from centers of industry, where labor conditions have heretofore been almost ideal and comparative freedom from unrest and extortionate demands has always been enjoyed. Some sort of Government supervision or control in this direction will ultimately be more necessary than regulation of prices.

To sum up, while much depends on the ultimate status of unfilled contracts and orders, it seems impossible that the Government prices, so called, can have any effect on merchants' sources of supply before the end of the year or indeed until they are subject to revision under the terms of the announcement. The worst and possibly the only effect from which distributors are likely to suffer is the stampeding of speculative jobbers who, if they would only keep their heads, sit tight and allow the situation to develop in a healthy way, would be able to effect without sacrifice and at a profit the orderly reduction in their stocks which would seem to be only reasonable and conservative. The members of our association should be able to exert a strong influence in this direction.

The Price Situation at Washington

WASHINGTON, Oct. 2.—The general committee of the steel manufacturers, which has heretofore co-operated with the Council of National Defense, is working night and day on a schedule of differentials to be applied to a large number of iron and steel products in a more advanced stage of manufacture than the basic commodities included in the list promulgated on Sept. 24. Every effort is being made to complete this list in time for its promulgation this week, but owing to the difficulties surrounding the work, it may not be published before Oct. 10. The committee is not yet certain as to how far the differentials will follow the ramifications of the industry, but it is probable that they will include prac-

tically every commodity usually quoted in the price current. It is regarded as important to cover all standard articles, but it is not thought to be practicable to include specialties or to carry refinements beyond currently quoted categories.

The committee has before it the category and controlled prices adopted by the British Government and promulgated by the Director of Steel Production, Ministry of Munitions of War, and in making up the differentials will be influenced to some extent by British experience. The British list includes no less than eight different varieties of metallurgical coke ranging in price from £1 5s. 8d. up to £2 3. Blast furnace and foundry coke are subdivided according to the region of production. Forty different varieties of pig iron are quoted in the British list at prices ranging from £4 7s. 6d. up to £9 2s. 7d. Hematite pig iron, for example, is divided into East Coast of four different grades, Scottish of two grades, Welsh of three grades and West Coast of three grades. Derbyshire, Leicestershire and Nottinghamshire pig are divided into five grades, including Nos. 1, 2 and 3 foundry, No. 4 forge and basic.

The British list also includes steel plates, angles, tees and flats, bars, small steel rounds, squares and hexagons, steel joists, rails, sheet and tin-plate bars, blooms and billets for rerolling, relayable rails, steel scrap, bar iron of standard quality in both ordinary sizes and merchant lengths, etc.

It is stated here that the category to be adopted for the United States will probably be even more detailed than the British list and will include practically everything concerning which any important question may arise.

Much interest is being manifested here by representatives of the smaller steel manufacturers in the differentials to be adopted and concerning its policy in the fixing of prices of finished products. Because of the small spread between pig iron and plates there is some anxiety as to whether the whole list of advanced products is to be so favorable for the big integrated concern and so unfavorable for the small manufacturer. Some pressure has been brought to bear upon the committee in connection with the promulgation of differentials, to revise the original list.

Small Producers and Government Business

Considerable speculation is being indulged in here as to the distribution of the Government's orders. It has been repeated many times that it is the purpose of the President to prorate orders as broadly as possible and to secure some sort of a contribution from practically every manufacturer in the country. The contention is made, however, that such a general distribution would work great hardship to small producers, and the question is being canvassed as to whether the big concerns will take practically all of the business. There would be little objection to such a plan so far as the small producers are concerned. While it is understood that the differentials to be promulgated, like the original list of basic commodities, will represent prices to be conceded to the United States Government, the Allies and private consumers in this country, the point has been made that in none of the statements thus far issued on this subject has there been any mention of the private consumers of steel products doing business in the allied countries. In discussing this phase of the case, a member of the steel committee suggests that while this class of consumers has not been taken care of it will not prove a very important factor in the present problem for two reasons. In the first place, the steel embargo has cut off a very large proportion of this business and, in the second place, any manufacturer located in one of the allied countries who is doing work related, even in the remotest degree, to the war will be able to secure his steel at the controlled prices by appealing to his government, which will thereupon attend to its purchase. It is regarded as unlikely that any specific ruling will be made to take care of the comparatively small number of private consumers of steel in the allied countries who are unable to invoke the assistance of their respective governments.

W. L. C.

Pittsburgh and Nearby Districts

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has decided to build a malleable iron foundry at its Cleveland plant for supplying hand grenades to the Government. The new foundry will be 160 x 260 ft. and is to be equipped with two 15-ton air furnaces. At present no equipment has been contracted for, but the company expects to place contracts soon. Prack & Perrine, Pittsburgh, have charge of the general engineering details of the new plant.

The American Sheet & Tin Plate Co. is making some additions and improvements to its plant at Leechburg, Pa. These include the erection of a new steel building to replace one of the present buildings housing a sheet mill.

Griffin Mfg. Co., Erie, Pa., manufacturer of steel strap, T and butt hinges, is erecting a steel building with steel sash, etc., the brick facing to be 150 ft. long by 56 ft. wide. The new building will be equipped with modern machinery for making the above named products.

The American Sheet & Tin Plate Co., Pittsburgh, will erect for the benefit of the women employees at its Farrell, Pa., works, a modern welfare building. The structure will be brick, with a frontage of 40 ft. depth of 72 ft., two stories in height and equipped with rest rooms, lockers, showers and a dining room to accommodate more than 100 persons. Electric stoves will be installed in the kitchen.

T. A. Gillespie & Co. of Pittsburgh and New York, have secured two very large contracts from the Carnegie Steel Co., at Pittsburgh. One is for a large pipe line for a distance of about 10 miles to be used for conveying gas from the Koppers by-product coke ovens at Clairton to the Duquesne Steel Works at Duquesne, Pa., where it will be used in the open-hearth furnaces, and also for other purposes. The other contract is for heavy railroad construction work from Clairton, where the Clairton Steel Works are located, to a point on the Union Railroad. This new railroad is to be used for delivering coal to the Koppers by-product ovens at Clairton.

The Kanter Metal Stamping Mfg. Co., of Conneaut, Ohio, has purchased the plant of the National Lamp Works. The deal involves the exchange of a 10-acre tract and the factory valued at about \$240,000.

The Modern Tool Co., Erie, Pa., has started work on the erection of a new office building.

The Heppenstall Forge & Knife Co., Pittsburgh, has an inquiry out for a 36-in. or 42-in. double-head vertical boring mill.

Export License Situation

It will be practically impossible for some time to get general shipments for export on tin plate or steel plate, according to C. A. Richards, director of the Bureau of Export Licenses, Washington, D. C., who addressed a meeting held on the morning of Oct. 2 in the Hotel Astor, New York, under the auspices of the Merchants' Association of New York. In these two products, as well as fodder, he claimed, exporters may expect little relief. He explained, however, that an effort is to be made to increase the time allowance within which to take orders to make the material and get it on ship-board. The plan is to allow 90 days instead of 60. It appears that it is not merely sufficient to put the products on cars at works and that 60 days is proving too short a time, particularly on shipments to the Pacific Coast. The headquarters of the bureau are at Washington because of the frequent necessity of conferring with numerous other boards in that city. Only one copy of a license is issued, as it is assumed that the railroads and the mills, for example, will take the word of a shipper of reputation, particularly if he follows up his claim of having a license with a statement of its number.

Machinery Markets and News of the Works

BUYING BREAKS RECORDS

Machinery Orders Aggregate Millions

Shipbuilding, Airplane, Munitions and Other Industries Engaged on War Equipment Place Unprecedented Business

Machinery and machine-tool business either just closed or about to be closed probably surpasses all precedent. Machine-tool builders report that September was one of the best months in their history, and the large amount of business in sight, which will be placed soon, will undoubtedly make October an equally active month.

The most important buying of the past week was that done by the General Electric Co. for its Erie, Pa., plant, which it is said will aggregate \$2,500,000. The General Electric Co. also bought for its other plants. The Erie Forge Co., Erie, is in the market for equipment which may cost \$1,500,000, its list including 60 boring and turning lathes for rough boring and turning guns for the Government.

The Crucible Steel Co. of America, Pittsburgh, which has not been a heavy buyer in the machinery market in some time, has sent lists to New York covering a large amount of equipment wanted for shell work for the Government, which, it is understood, will be done in its Harrison, N. J., plant.

The United States Navy Department has invited bids on 61 tools for the Boston Navy Yard, including radial and sensitive drilling machines, engine lathes, boring and turning mills, planers, shapers, etc.

The Federal Shipbuilding Co., New York, which has considerable additional buying to do, is expected to issue lists this week of machine tools and cranes for its yard on the Hackensack Meadows.

The Worthington Pump & Machinery Corporation is buying for its Jeanesville plant at Hazelton, Pa., and its Blake & Knowles plant. R. Hoe & Co., New York, have placed additional orders for tools required for work on gun mounts. Walter Scott & Co., Plainfield, N. J., have bought more tools for building gun carriages. The International Arms & Fuse Corporation, Bloomfield, N. J., is reported to have obtained a Government contract for primers and may require additional equipment. The Nathan Mfg. Co., Flushing, N. Y., has issued a small list. Slocum, Avram & Slocum, Inc., New York, and the F. L. Schmidt Co., New York, are buying a number of tools.

The American International Corporation, which has opened executive and purchasing departments in Philadelphia, has become a big buyer, having placed last week the largest single contract ever given for derricks and hoisting engines, totalling \$2,400,000 in value. The American Hoist & Derrick Co., St. Paul, Minn., received

the contract, which is for 500 derricks of the stiff-leg type, 5-ton capacity at 80 ft. radius, for shipways, and 500 hoisting engines. This corporation received bids last week on \$150,000 worth of pumps and \$68,000 worth of air compressors. All of this equipment and still more to be purchased are for the Hog Island ship assembling yard, which it is building and will operate for the Emergency Fleet Corporation. It is now in the market for a large number of locomotive cranes. The Submarine Boat Corporation and the Lackawanna Bridge Co. will also use derricks for shipways at their plant now building on the Newark Meadows. The derricks, it is understood, will be built by the Lackawanna Bridge Co., but the hoisting engines will be bought in the market.

The Merchant Shipbuilding Corporation and the Chester Shipbuilding Co. are closing rapidly for about 90 punch-shop machines which they recently inquired for, 60 for the Bristol plant and 30 for the Chester plant. Considerably more equipment is to be bought by both companies, including power plant equipment, costing \$1,000,000 or more, and machines for pipe, blacksmith, machine and woodworking shops. The Merchant Shipbuilding Corporation has closed a contract with the Champion Iron Co., Kenton, Ohio, for five gantry cranes, double trolley, 85-ft. span, 10-ton capacity, and the Chester Shipbuilding Co. has placed with the same company an order for three gantry cranes of the same capacity and span and five shop cranes, three of 5-ton, one 7½-ton and one of 15-ton.

The Fore River Shipbuilding Corporation, Quincy, Mass., is receiving bids for about 45 or 50 cranes, in addition to the large number of machine tools, punching and shearing machinery, hydraulic machinery, etc., for which lists were recently issued. The cranes required for the torpedo boat destroyer building program are mostly of 5 and 10-ton capacity. It is reported that the Fore River Shipbuilding Corporation will build 75 of the 150 destroyers which Secretary of the Navy Daniels' recently reported program provided for.

The Eastern Shore Shipbuilding Corporation, of which R. R. Livingston, 2 Rector Street, New York, is president, has acquired a shipbuilding plant at Sparrows Point, Md., and will erect additional buildings, for which new equipment will be required.

Authorization of the Aircraft Board by Congress is expected to speed up production of aircraft engines. Buying of machine tools by the General Vehicle Co., Long Island City, N. Y., and the Simplex Automobile Co., New Brunswick, N. J., which has been pending for several weeks on account of delay in signing of contracts with the Government, may ultimate at any moment. Purchases by these two companies will aggregate several millions of dollars. The Nordyke & Marmion Co., Indianapolis, which has a contract for 3000 Liberty airplane engines, aggregating \$2,700,000, according to latest report, has been buying equipment heavily in the Cleveland market, its order for turret

lathes alone totalling \$100,000. The Lincoln Motor Co., Detroit, in which Henry M. Leland and his son are the principal factors, is spending \$5,000,000 in Detroit for site, plant and equipment for building Liberty airplane engines.

Detroit manufacturers are reported to hold Government contracts aggregating about \$250,000,000 for airplane engines, trucks, munitions and other war equipment. It is announced from that city that the Government will soon let contracts for 40,000,000 rounds of ammunition, a part of which work a Detroit manufacturer is bidding on. The Packard Motor Car Co. is reported to have received additional contracts for motor trucks and passenger automobiles for the Army. The Detroit plant of the American Car & Foundry Co. is reported to have received a large order for artillery vehicles.

The Falls Motor Corporation, Sheboygan Falls, Wis., has taken a large order for motors and parts from the Curtiss Aeroplane & Motors Corporation, Buffalo, N. Y.

Buying in the Cleveland market is particularly active. A considerable portion of the business placed by the General Electric Co. for its Erie, Pa., plant, as above mentioned, went to Cleveland machine-tool builders, who have also bid on the large requirements of the Erie Forge Co., Erie, Pa. The Standard Parts Co., Cleveland, has been buying for its various plants, its orders aggregating more than \$260,000, the bulk of which is for extensions to its Cleveland Axle plant at Canton, Ohio. The Worthington Pump & Machinery Corporation has given a Cleveland manufacturer an order for about 30 screw machines.

The Bowen Anchor Co., Morton, Pa., which is building a new plant, including an open-hearth furnace, for making steel anchors for the Government, will buy four cranes. The Groton Iron Works, New London, Conn., has asked for bids on three 5-ton cranes for its shipbuilding fabricating shop. The Stone & Webster Engineering Corporation has bought three more cranes for the Watertown Arsenal, making eight in all. The Tacony Ordnance Corporation, Tacony, Pa., is expected to close this week for 14 cranes, for which bids were recently asked. Miscellaneous crane inquiries are numerous, but considerable business is not placed because of far-off deliveries, other means of handling material being sought.

Machine-tool and crane builders do not look for nearby changes in prices as a result of price-fixing of pig iron and steel. It is believed that advances are checked, but recessions are considered improbable, at least until the expiration of existing contracts at higher prices than those which the Government has named.

New York

NEW YORK, Oct. 2.

The Crucible Steel Co. of America, Pittsburgh, which has not been a heavy buyer in the machinery market for some time, is now figuring in the New York market for a large amount of new equipment for Government shell work, which will be done, it is understood, at the Harrison, N. J., plant.

The General Electric Co. last week closed large orders for machine-tool equipment for its Erie, Pa., plant, the investment for which, it is reported, will aggregate \$2,500,000. The General Electric Co. is also closing for tools for its Schenectady, N. Y., Philadelphia and West Lynn, Mass., plants.

The United States Navy Department is calling for bids on the following machine tools for the Boston Navy Yard: 1 drill, plain, radial, 6-ft.; 1 drill, plain, radial, 5-ft., motor-driven; 2 drills, sensitive, 14-in., single spindle; 2 drills,

sensitive, single spindle, high speed, ball bearing; 10 lathes, engine, double back-geared; 8 lathes, engine, quick change, 20 x 12 ft.; 1 lathe, engine, quick change, motor-driven, 16 in. x 8 ft.; 12 lathes, engine, quick change, 16 in. x 8 ft.; 2 lathes, engine, triple-geared, 36 in. x 32 ft.; 1 lathe, engine, geared head, heavy duty, 48 in. x 22 ft.; 2 machines, semi-universal, 4-ft., radial drilling, motor-driven; 1 machine, full-universal, 5-ft., radial drilling; 1 mill, side boring, 36-44 in., motor drive; 1 mill, vertical boring and turning, 62 in.; 1 mill, standard boring and turning, 53-in.; 1 mill, boring and turning, 7-ft.; 1 planer, 24 x 24 in. x 6 ft., with reversing motor drive; 1 planer, 30 x 30 in. x 10 ft., with reversing motor drive; 1 planer, 42 x 42 in. x 12 ft., with reversing motor drive; 1 planer, 96 x 96 in. x 24 ft., with reversing motor drive; 4 presses, drill, upright, back-geared, 32-in. sliding head; 1 shaper, crank, heavy duty, back-geared, 24-in.; 2 shapers, crank, heavy duty, 20-in., 2-piece; 3 shapers, crank, heavy duty, back-geared, 16-in.

The International Arms & Fuse Corporation, Bloomfield, N. J., is reported to have obtained a Government contract for primers, and may require additional equipment. Walter Scott & Co., Plainfield, N. J., who have a Government contract for gun carriages, closed last week for several tools. The bulk of their purchasing was done a few weeks ago. R. Hoe & Co., New York, printing press builders, are to build gun mounts for the Government, and closed last week for additional equipment. The Worthington Pump & Machinery Corporation is buying for its Blake & Knowles plant. The Nathan Mfg. Co. is buying additional tools for its new brass plant at Flushing, Long Island. Slocum, Avram & Slocum, Inc., New York, is buying several new tools. The F. L. Schmidt Co., New York, is in the market for a number of tools for work on envelope machinery.

It is reported in the trade that additional lists of tools to be bought by the Federal Shipbuilding Co., New York, and also a list of cranes to be purchased will be issued this week.

Action by Congress authorizing the Aircraft Board and giving this board full powers will, it is expected, tend to bring out new inquiries for tools for aircraft engines, and purchasing may come soon on the lists recently issued by the General Vehicle Co., Long Island City, N. Y., and the Simplex Automobile Co., New Brunswick, N. J.

The Groton Iron Works, New London, Conn., has invited bids on three 5-ton cranes, with 38, 48 and 58 ft. spans for its fabricating shop. The Stone & Webster Engineering Corporation has placed an order for three cranes for the Watertown Arsenal, making eight in all which have been bought.

The Submarine Boat Corporation and the Lackawanna Bridge Co., which are erecting in co-operation a ship assembling plant on the Newark Meadows for the Emergency Fleet Corporation, will, it is reported, use derricks and hoisting engines for handling material on the shipways. The Lackawanna Bridge Co. may build the derricks. Hoisting engines will be purchased in the market.

The Fore River Shipbuilding Corporation is obtaining bids on 45 to 50 cranes of various types, mostly of 5 and 10-ton capacity, which will be used in the new shipbuilding plant for torpedo boat destroyers, which this company will build for the Government adjoining its present plant. It is reported that 75 destroyers will be built in the new plant.

The Eastern Shore Shipbuilding Corporation, of which R. R. Livingston, 2 Rector Street, New York, is president, has purchased a shipbuilding plant at Sparrows Point Md., which it will enlarge. New equipment will probably be required.

Marburg Brothers, Inc., 90 West Street, New York, is in the market for a 25 to 35 ft. vertical boring mill, either new or second-hand.

The Hungerford Brass & Copper Co., 80 Lafayette Street, New York, has commenced the erection of a new building at 90-92 White Street.

The Automatic Inserting Machine Corporation, New York, has been incorporated with an active capital of \$25,000 to manufacture special machinery for envelope insertion. D. O'Connor, F. W. Hanberg and A. Hartkorn, 299 Broadway, are the incorporators.

Neri & Sitra, Inc., 10 Bridge Street, New York, operating a ship works, has changed its corporate name to the National Ship Corporation.

The Amalgamated Oil-Gas Corporation, New York, has been incorporated with a capital of \$600,000 to manufacture gas making machinery. A. F. McCabe, S. C. P. Dodd and A. E. Moore, 37 Wall Street, are the incorporators.

The American Malleables Co., 30 Church Street, New York, has increased its capital from \$1,000,000 to \$2,000,000.

The L. W. F. Engineering Co., Inc., College Point, L. I., has acquired property in the vicinity of Tenth Street for the erection of additions. It specializes in the manufacture of airplanes, particularly for Government service.

The Greene-Wolf Co., New York, has been incorporated with a capital of \$20,000 to manufacture engines, etc. M. J. Baumgarten, D. Greene, and G. W. Wolf, 782 East 175th Street, Bronx, are the incorporators.

Thomas H. Dobbins, New York, and associates, have incorporated in Delaware the Dobbins Core Drill Co. with capital of \$250,000 to manufacture drilling machines. Reuben S. Baldwin and Roy T. Guthman, New York, are also interested in the company.

The United States Ship Winch Co., New York, has been incorporated with a nominal capital of \$5,000 to manufacture marine machinery. A. A. Schroeder, D. J. Mulqueen and S. J. Joseph, 154 Nassau Street, are the incorporators.

The New York Mitchell Motor Co., New York, has been incorporated with a capital of \$100,000 to manufacture automobiles and airplanes. A. Foshay, A. G. Phaenum and R. Goldman, 1190 Madison Avenue, are the incorporators.

The Fifth Avenue Coach Co., 10 East 102nd Street, New York, has filed plans for the erection of a five and seven-story factory, about 400 x 425 ft., on 132nd Street, near Broadway, to cost \$1,000,000. It will be used for the manufacture of electric motor buses. Richard W. Meade is president.

The Tuckaway Folding Ladder Co., New York, has been incorporated with a capital of \$50,000 to manufacture folding ladders and metal specialties. S. Malin, G. H. A. and W. A. Kohler, 2201 Andrews Avenue, Bronx, are the incorporators.

The Judaline Machine Co., New York, has been incorporated in Delaware with capital of \$100,000 to manufacture tin and metal cans and boxes. S. B. Howard, A. W. Britton and J. A. Moore, all of New York, are the incorporators.

The Foxon Graphite Co., Hague, N. Y., is said to be considering the construction of a new plant to cost about \$300,000. John Rogers & Co., 25 Broad Street, New York, represent the company.

The Schencke Piano Co., 273 Rider Avenue, New York, is considering the erection of a new three-story plant, about 60 x 90 ft., on 137th Street to cost \$75,000.

Taylor's Motor Corporation, New York, has been incorporated with a capital of \$100,000 to manufacture automobiles and motor vehicles. E. H. Rodgers and H. R. Worthington, 37 Wall Street, are the incorporators.

The American International Shipbuilding Corporation, New York, has been incorporated with a capital of \$2,000,000 at Dover, Del., to operate a shipbuilding works at Hog Island, Philadelphia. J. E. Manter and E. M. Ellsund, New York, are the incorporators.

The Bureau of Yards & Docks, Washington, D. C., has had plans prepared for the construction of a new power plant at the naval hospital, Brooklyn, N. Y., and will soon call for bids. F. R. Harris, chief.

The Western Electric Co., Chicago, manufacturer of electrical goods, is reported to be planning for the establishment of a new manufacturing plant at New York, to cost about \$500,000. It is said that the proposed works will cover over 250,000 sq. ft. Executive offices are at 195 Broadway, New York.

The Jensen Creamery Machinery Co., Long Island City, N. Y., has leased property at 18 Hunters Point Avenue for extensions.

Wilson, Roberts & Monroe, Inc., New York, has been incorporated with a capital of \$100,000 to manufacture automobile engines. A. Skillman, A. G. Thaanum and A. Foshay, 120 Broadway, are the incorporators.

The Bennett Wire Co., 13 Park Row, New York, manufacturer of wire, has increased its capital from \$15,000 to \$75,000.

The New York Dock Co., 44 Whitehall Street, New York, has awarded a contract for the erection of a three-story, reinforced-concrete building, about 53 x 153 ft., on property recently acquired on Furman Street, Brooklyn.

The Belgian-American Mfg. Co., New York, has been incorporated with a capital of \$10,000 to manufacture surgical instruments, tools, etc. F. Bloom and A. and V. Anzelowitz, 55 East Eleventh Street are the incorporators.

P. Keller & Co., 465 Greenwich Street, New York, manufacturer of machinery, has changed its name to the Merit Machine Mfg. Corporation.

A. W. Britton and S. B. Howard, 65 Cedar Street, New York, have incorporated in Delaware the Metropolitan Sewing Machine Corporation, with capital of \$1,250,000.

The Imperial Slicing Machine Co., New York, has been incorporated with a capital of \$12,000 to manufacture slicing machines, etc. J. H. Burnell, A. J. Murray and E. Hemming, 93 Bleecker Street, Brooklyn, are the incorporators.

The Thomas McNamara Co., Brooklyn, N. Y., operating a coppersmithing works at 106 Twenty-fifth Street, has been incorporated with a capital of \$10,000. T. D. McNamara, J. Cotter and W. E. Lambden are the incorporators.

The Astoria Casket Co., Astoria, L. I., is building a new plant on Fourth Avenue to cost about \$10,000.

The Universal Clutch Co., New York, has been incorporated with a nominal capital of \$5,000 to manufacture clutches and machinery. B. F. Dunlap, P. J. Shields and A. O. Hoyt, 511 Fifth Avenue, are the incorporators.

The Lazear-Allen Corporation, New York, has filed articles of incorporation with a capital of \$10,000 to manufacture engines, motors, etc. R. F. Allen, E. W. Lazear and F. J. Haas, 916 East 179th Street, are the incorporators.

The Keystone Brass Co., New York, has been incorporated with a capital of \$10,000 to manufacture brass, copper and iron specialties. S. L. Cohen, E. A. Alafberg and G. C. Norton, 617 Fifth Avenue, New York, are the incorporators.

The McCoy Iron Works, Seaman Street, Perth Amboy, N. J., has awarded contracts for the erection of a one-story steel fabricating plant, 125 x 400 ft., on Mortimer Street, Utica N. Y., to cost about \$10,000.

The Truxtun Motor Sales Co., Syracuse, N. Y., has been incorporated with a capital of \$10,000 to manufacture automobile specialties. O. H. Greene, G. M. Wilson and J. H. O'Brien are the incorporators.

The Willys Morrow Co., Elmira, N. Y., manufacturer of aircraft engine parts, has awarded a contract for the construction of a new assembling and testing works on Scott Street, to consist of three one-story buildings, 185 x 360 ft., 120 x 137 ft., and 100 x 120 ft., respectively. The new plant is estimated to cost about \$300,000.

The Taylor Instrument Companies, 95 Ames Street, Rochester, N. Y., manufacturer of thermometers, etc., have awarded a contract for the erection of a three-story addition, about 47 x 50 ft.

The Armstrong Rubber Co., Rochester, has been incorporated with a capital of \$35,000 to manufacture automobile tires. A. L. Gilman, S. X. Newman and R. C. Schaefer are the incorporators.

The Viking Corporation, Fulton, N. Y., has been incorporated with a capital of \$60,000 to manufacture airplanes. H. H. Hunter, C. M. and R. H. Allen, Fulton, are the incorporators.

The Chicago Conduit Co., Fulton, N. Y., has commenced the erection of a new plant.

The Fulton Steel Co., Fulton, has been incorporated with a capital of \$120,000 to manufacture iron and steel products. G. C. Warner, H. W. McAteer, and C. W. Elhany, 233 Broadway, New York, are the incorporators.

The General Electric Co., Schenectady, N. Y., has taken bids on revised plans for the construction of a two-story brick and steel drop forge plant, about 85 x 400 ft.

The Inland Barge Co., Monroe, N. Y., has been incorporated with a capital of \$500,000 to manufacture submarines and other vessels. J. A. Anderson, C. Baird and J. W. Pillow, 420 West 156th Street, New York, are the incorporators.

The Forsyth Automatic Pump Co., Rochester, N. Y., has been incorporated with a capital of \$800,000 to manufacture automatic pumping equipment. G. D. Forsyth, C. W. Mackay and C. W. Gregg, 605 West 112th Street, New York, are the incorporators.

The Willis Bumper Co., Woodcliff, N. J., has been incorporated with a capital of \$100,000 to manufacture automobile bumpers. Wilber De Graw, 958 Broadway, Woodcliff, Thomas Dixon and R. C. Treiling are the incorporators.

The Federal Adding Machine Co., East Orange, N. J., has been incorporated with a capital of \$10,000,000 to manufacture adding machines. Gordon Grand, Harry H. Pickings, and Charles O. Geyer are the incorporators.

Henry Byrne, 392 Mercer Street, Jersey City, N. J., is having plans prepared for a new one-story machine shop, about 50 x 95 ft., to be erected on State Street at a cost of \$8,000.

The Duquesne Aircraft Corporation, Jersey City, has been incorporated in Delaware with capital of \$1,000,000, to manufacture airplanes. Pierre S. LeRoux, Jersey City; Nelson Lingard and Thomas Costello, New York, are the incorporators.

The Summit Cutlery Co., Jersey City, has been incorporated with a nominal capital of \$4,000 to operate a local plant. Charles H. Bick, 106 Paterson Street, Jersey City; Henry Cohen, 854 180th Street, and Hugo L. Funk, 119 Bleecker Street, New York, are the incorporators.

The Pneumatic Concrete Machinery Co., 65 Flisk Street, Jersey City, has been incorporated with a capital of \$75,000 to manufacture concrete mixing and conveying machinery. Allen L. Story, W. A. Kitts, Jr., and Charles R. Allison, all

New York, are the incorporators. They have also incorporated the Vacuum Ash & Soot Conveyor Co., Jersey City, with \$75,000 capital, to manufacture ash and soot conveying machinery.

The H. & S. Tool Co., 288 Davis Avenue, Arlington, N. J., has been incorporated with a capital of \$10,000 to manufacture tools and implements. John Bylund, John and A. M. Struberg, Arlington, are the incorporators.

Philadelphia

PHILADELPHIA, Oct. 2.

The American International Corporation, which is putting up a ship-assembling plant on Hog Island, Philadelphia, for the Emergency Fleet Corporation, has opened executive offices and purchasing department at the Bellevue-Stratford Hotel and will later be located at 142 North Broad Street. It has become one of the largest buyers in the East. A contract was closed last week with the American Hoist & Derrick Co., St. Paul, Minn., for 500 stiff-leg derricks of 5-ton capacity at 80 ft. radius and 500 hoisting engines, the total order aggregating \$2,400,000, which is said to be the largest single order for derricks and hoists ever given to one company. Deliveries will be made beginning Dec. 1. The American International Corporation has also received bids and will award contracts soon for \$150,000 worth of pumps and about \$68,000 worth of air compressors. Punch shop machines, riveting tools, power plant equipment, etc., will also soon be bought. Walter Goodenough, general manager, is in charge of purchasing.

Other shipbuilding companies are also active buyers. The Merchant Shipbuilding Corporation and the Chester Shipbuilding Co., Finance Building, are closing rapidly for punch-shop machines, about 60 being required for the Merchant plant at Bristol and about 30 for the Chester plant at Chester, Pa. Other purchases to be made by these companies will include more than \$1,000,000 worth of power plant equipment, including air compressors, generators, converters, coal conveyors, turbines, etc., and machines for pipe, blacksmith, machine and woodworking shops at both plants. The Merchant Shipbuilding Corporation has just bought five gantry cranes with 85 ft. span and double trolley from the Champion Iron Co., Kenton, Ohio, represented by J. N. Kinney, 30 Church Street, New York, and the Chester Shipbuilding Co. has bought three gantry cranes of the same type and five shop cranes from the same company. The shop cranes are equipped with double trolley; there is one 5-ton 85-ft. span crane; two 5-ton with 45 ft. span; one 7½-ton with 60 ft. span and one of 15-ton capacity with 85 ft. span.

The Bowen Anchor Co., which is breaking ground for a steel anchor plant at Morton, Pa., is in the market for four cranes, two of 20-ton capacity with 50 ft. span and two stationary yard cranes of 15-ton capacity with full circle swing. This company will install an open-hearth furnace and is understood to be in the market also for steel-making equipment. Steel anchors will be made for the United States Government.

The Worthington Pump & Machinery Corporation, Jeannette works, is closing for machine tools inquired for some weeks ago, which will be used on a Government shell contract. The General Electric Co. is buying for its Philadelphia plant. The Pennsylvania Railroad Co. is buying for its shops at Altoona, Pa.

The Artillery Fuse, Wilmington, Del., is understood to be making plans for adding additional equipment to take care of a Government fuse contract. This company made time fuses for heavy shells for the Allies. The Eddystone Ammunition Corporation, Eddystone, Pa., is said to be expecting a Government shell order.

The Pearce Rubber Corporation, 932 North Broad Street, Philadelphia, is taking bids for the erection of a two-story plant, about 160 x 225 ft., at Lippincott and Twenty-first Streets, to cost about \$150,000. A. L. Pearson is president.

The Philadelphia Electric Co., Philadelphia, has awarded a contract to Stone & Webster, Boston, Mass., for the construction of a new brick, steel and concrete electric power plant at Beach and Palmer Streets, about 400 x 400 ft., estimated to cost, with equipment, \$8,000,000.

The United States Government has taken bids for the erection of a three-story primer and artillery planing and riveting shop, 52 x 152 ft., and 25 x 28 ft., at the Frankford Arsenal, Philadelphia.

The Cook Gear Shift Co., Philadelphia, has been incorporated in Delaware with capital of \$100,000 to manufacture gear shifting devices. John R. Kearns, C. A. Murphy and M. Hills, Philadelphia, are the incorporators.

The Quaker City Rubber Co., 629 Market Street, Philadelphia, has filed plans for the erection of an addition to its plant at Comly and Milner Streets to cost about \$5,000.

The Bureau of Yards & Docks, Washington, D. C., is taking bids until Oct. 8, for the erection of six new buildings at the League Island Navy Yard, Philadelphia, to include a one-story, reinforced-concrete galvanizing plant, 61 x 122 ft.; oxy-acetylene generating plant, 64 x 64 ft., and other structures.

The Cobro Mfg. Co., Philadelphia, manufacturer of hooks and eyes, etc., has acquired the property of Ware Brothers, Vineland, N. J., for the establishment of a new plant.

The Bogart Co. Philadelphia, has been incorporated with a capital of \$50,000 to manufacture machinery. K. M. Haun is the principal incorporator.

A one-story shop, 50 x 225 ft., for automobile repair and construction work, to cost about \$23,000, will be erected by the Atlantic Refining Co., 3144 Passyunk Avenue, Philadelphia, at Twenty-sixth Street and Oregon Avenue.

The Westinghouse Electric & Mfg. Co. Pittsburgh, Pa., has leased a five-story factory, with about 60,000 sq. ft. of manufacturing space, now in course of erection at 927-31 North Front Street, Philadelphia, for the manufacture of its specialties.

The Fox Auto Radiator Co., Philadelphia, will erect a new factory on Vine, near Thirteenth Street, to cost about \$8,500.

The George L. Carroll Co., Philadelphia, has been incorporated in Delaware with capital of \$25,000 to manufacture automobiles and motor trucks. George L. Carroll, Alfred F. Brachm, and Harry E. Prutzman, Philadelphia, are the incorporators.

Albert Berry, 6067 Ridge Avenue, Philadelphia, will erect a new one-story shop at Ridge and Leverington Avenues, to cost about \$5,000.

The Ajax Rubber Co., Trenton, N. J., will erect a one-story brick and reinforced-concrete addition to its plant on Breunig Avenue.

W. H. Nicholson & Co., 12 Oregon Street, Wilkes-Barre, Pa., manufacturers of machine tools, etc., are building a one-story addition about 50 x 117 ft., at Wood and St. Clements Streets, to cost \$15,000.

A one-story power plant, about 30 x 42 ft., to cost \$10,000, will be erected by the Maccar Truck Co., Scranton, Pa., at its new plant now in course of construction at Providence Road and Gilligan Street. P. Q. Sylvester is president.

The Scranton Foundry & Engine Works, Hickory Street, Scranton, has received a contract from the Government for a number of marine engines for 3500-ton vessels to be constructed by the Emergency Fleet Corporation. The units will be about 1400 hp. and cost over \$50,000 each. The entire contract, it is said, totals \$1,000,000. The company is occupying the plant formerly used by the Touhill Iron Works. It has recently increased its capital from \$100,000 to \$700,000.

The McClave-Brooks Co., Poplar Street and Park Place, Scranton, manufacturer of iron and steel castings, grates, etc., has awarded a contract for the erection of a one-story addition, about 30 x 150 ft., to cost \$12,000.

Stanley G. Flagg & Co., Stowe, Pa., manufacturers of pipes and tubing have had plans prepared for the erection of a new one-story brick foundry, about 50 x 170 ft. Headquarters of the company are at 142½ Chestnut Street, Philadelphia.

Hoffman Brothers, York, Pa., operating a pattern works, are planning for immediate extensions to increase the present capacity.

The United States Gauge Co., Sellersville, Pa., manufacturer of gages, etc., is building a two-story addition, 50 x 50 ft. on Clymer Street to cost about \$15,000. A new one-story tube and paint shop, about 35 x 85 ft., to cost \$6,000, will also be erected.

The Titan Metal Co., Bellefonte, Pa., is planning for the erection of additions to its plant to increase the capacity for the manufacture of bronze rods and kindred specialties, a large portion of which will be for Government service. Construction has begun on a one-story addition, 60 x 200 ft., and plans have been completed for the erection of two other buildings, 50 x 150 ft. and 35 x 125 ft., respectively. It is expected to have the works in operation within 60 days, when employment will be given to more than 400 hands.

The International Motor Car Co., Allentown, Pa., has received a Government order for 1000 motor trucks, each of 8 tons capacity, which, it is said, totals \$4,500,000. The work will be handled at the local plant.

The Emerson-Brantingham Co., Waynesboro, Pa., manufacturer of machinery, has received a contract from the Government for the manufacture of gun carriages. The work will be handled at the local plant. The company is planning to manufacture gasoline traction engines in four sizes at the Waynesboro works instead of at its Minneapolis plant, as heretofore, and will employ over 500 additional hands.

Baltimore

BALTIMORE, Oct. 1.

The American Propeller & Mfg. Co., 233-249 East Hamburg Street, Baltimore, Md., will build an addition to its plant.

The Poole Engineering & Machine Co., Woodberry, Md., has awarded a contract for the construction of a gun shop at Texas, Md., to Crowell, Dundhoff & Smith, Cleveland.

The Universal Safety Appliance Corporation, 1518 Warner Street, Baltimore, has been incorporated with \$100,000 capital stock to deal in safety appliances, mechanical devices, etc. The incorporators are William H. Stout, Edward W. Salmon, Charles Buetelesch and W. Scott Hull.

The large plant of the Crown Cork & Seal Co. at Highlandtown, Md., is nearing completion and probably will be in operation soon. The building is five stories, U-shaped, and covers an area of 30,000 sq. ft. There will be a roof garden for the benefit of the employees.

The Maryland Shipbuilding Co., Lexington Street Building, Baltimore, has commenced the erection of its new shipbuilding plant, which includes shipways, shop buildings, mold plant, sawmills, etc. The company has a capitalization of \$1,000,000. Thomas Benson is general manager.

The Baltimore Gas Appliance Co., Bayard and Hamburg Streets, Baltimore, has awarded a contract for the construction of a one-story addition to its foundry.

The Bureau of Yards & Docks, Washington, D. C., is taking bids for additional buildings at the new projectile works for the Government at Charleston, W. Va., estimated to cost about \$35,000.

The Richmond Engineering Co., 12 South Eighth Street, Richmond, Va., manufacturer of tanks, stacks, hand forgings and sheet metal products, has awarded a contract for the erection of a new two-story plant to cost about \$15,000. Plate, bar and sheet metal equipment and general machinery will be installed. E. W. Farley is president.

The Continental Automatic Sprinkler Co., Richmond, has been incorporated with a capital of \$300,000 to manufacture automatic sprinklers. John Adam and William E. Word are the principal incorporators.

The North Carolina Shipbuilding Co., Morehead City, N. C., will erect a shipbuilding plant on property recently acquired. It has secured a Government contract for the construction of several 3500-ton vessels. G. D. Canfield is president.

The Carolina Power & Light Co., Raleigh, N. C., has acquired five new power sites on the Yadkin and Pee Dee rivers, in the vicinity of Badin, for the installation of new electric power plants.

The Hanes Rubber Co., Winston-Salem, N. C., manufacturer of automobile tires, is planning to double the capacity of its plant.

Chicago

CHICAGO, Oct. 1.

Features of unusual interest are lacking in this market. A good steady business is being done in miscellaneous directions with the trade well satisfied. One sealer stated that the week has not been as good as the preceding one, but that he would be content if the present level is maintained. Large machines continue to be in heaviest demand.

Builders of machine tools do not look for any change in their prices as a result of the price-fixing events of the past week at Washington. It is believed that advances are checked but recessions are considered most improbable. A few prospective buyers have asked if prices would be lower in view of the pig-iron price having been fixed at \$33, but seem satisfied when it is pointed out that high-priced iron will continue to go into machines through the operation of contracts. Incidentally high labor costs will support prices of finished products.

The Buda Co., Harvey, Ill., has started the construction of a manufacturing building, 80 x 260 ft. It has been an active buyer of machine tools of late.

The Inter-Ocean Refining Co., 322 South Michigan Avenue, Chicago, which recently purchased a large tract of land near Lyons, Ill., has had plans prepared for a power house, stills, filter house, kiln, pump house and other buildings. The plant will eventually cost \$325,000.

George F. Poulsen, architect, 327 South La Salle Street, Chicago, is taking bids on a machine shop of mill construction, 60 x 180 ft., to be erected in Maywood, Ill., and to cost \$15,000.

A contract has been awarded for a one-story and gallery

factory, 61 x 180 ft., and a one-story boiler house, 40 x 65 ft., for the Raymond Brothers Impact Pulverizer Co., 1319 North Branch Street, Chicago.

Contracts have been let for the construction of a one-story and basement machine shop, 50 x 96 ft., at 2428 Lowe Avenue, Chicago, for the Octigan Drop Forge Co.

A permit has been issued to the International Harvester Corporation, 606 South Michigan Avenue, Chicago, for the construction of a one-story heat-treating building, 55 x 100 ft., at its works, 2600 West Thirty-first Street, to cost \$20,000.

The Illinois Steel Co., South Chicago, will erect a one-story locomotive repair shop, to cost \$15,000.

The Chicago Nipple Mfg. Co., Chicago, has increased its capital stock from \$50,000 to \$200,000.

The Automatic Vending Machine Co., Rock Island, Ill., has been incorporated with a capital stock of \$20,000 by W. F. Bradley, S. E. Hamilton and Carl Shields.

The United States Smelting Furnace Co., Belleville, Ill., has been incorporated with a capital stock of \$5,000.

The Rock Island Plow Co., Rock Island, Ill., has begun the construction of an addition to its tractor plant which, when completed, will double its capacity.

Work has been started on the \$500,000 plant to be erected in East St. Louis, Ill., for the American Mfg. Co. It will employ 1000.

The Electric Machinery Co., Minneapolis, Minn., will double its capacity by constructing an addition, 64 x 122 ft., which is expected will be completed in 90 days. It has a contract for supplying electric generators to the Rock Island Arsenal, Rock Island, Ill.

The Federal Steel & Mfg. Co., Minneapolis, Minn., has purchased 12 acres and will erect a plant to cost about \$500,000. The buildings contemplated consist of three machine shops, each 110 x 400 ft., and a foundry, 100 x 125 ft. The company was incorporated with a capital stock of \$1,000,000 to manufacture coal briquetting machinery and expects to employ 1000 men. The officers are F. D. McClure, president; F. W. Fernholtz, vice-president and chief engineer; Frank F. Peard, second vice-president; E. G. Fernholtz, treasurer and engineer in charge of construction, and P. S. Van Bloom, secretary.

The Chicago, Burlington & Quincy Railroad, Chicago, is building a new one-story machine shop, about 40 x 120 ft., at Clyde Station, Cicero, Ill., to cost about \$50,000.

The Superior Packless Valve Co., Chicago, has been incorporated in Delaware with capital of \$250,000, to manufacture valves. W. E. Heagstedt, Benjamin A. Leafgreen and Charles D. Verdier, Chicago, are the incorporators.

Milwaukee

MILWAUKEE, Oct. 1.

Orders for machine-tools, cranes and other metal-working machinery continue to be absorbed by local manufacturers, although deliveries are being pressed further forward by the enormous volume of business already booked. There has been no relief from the high-pressure conditions existing for some time and if anything the situation is less favorable. Local industries are considerably relieved by the fixing of steel prices, which is expected to contribute much to stabilization, and architects are looking forward to increased building activity. Complaint is heard throughout the State that small metal-working shops are suffering from delays in deliveries of raw and finished materials, or their inability to get much-needed supplies. The growing shortage of labor contributes another strong element of uncertainty. Even the general employment of female help is providing only temporary relief, it is stated.

The Western Rope & Mfg. Co., 325-333 Robinson Building, Tulsa, Okla., manufacturer of oil-well machinery and equipment, has purchased the plant and business of the Schneck Machine Co., 809-811 St. Paul Avenue, Milwaukee, and contemplates a total investment of approximately \$250,000 in this city. The Schneck shop, which has been doing a jobbing and special machinery business, is being re-equipped for the production of gas engines, boilers, etc., for oil-fields. As soon as practicable, the Western company will erect additions on acreage recently acquired near the former Schneck plant. The Tulsa works will be continued as before, except that they will be gradually enlarged for an increased production of wire rope. B. M. Gessel, general manager of the Western company, expects to spend considerable time in Milwaukee. James K. Bradley has been appointed works manager at Milwaukee.

The Crank Shaft Valve Movement Corporation, Green Bay, Wis., which has been incorporated with an authorized capital

of \$300,000, intends to manufacture a gearless internal combustion engine, which has been perfected by Jules Gerard, Green Bay. For the present the company will try to interest automobile manufacturers in the motor and a plant will be established in Green Bay as soon as the volume of business warrants the investment.

The Hamilton Mfg. Co., Two Rivers, Wis., manufacturer of steel type cabinets, printers' furniture, type, etc., has purchased the Chester, Pa., steel furniture plant of the Keystone Type Foundry, Philadelphia, which will retire from business, and has sold its steel type works to the American Type Founders Co. The Chester plant will continue in operation until the Two Rivers factory can be enlarged sufficiently to accommodate the machinery and equipment.

The C. H. & E. Mfg. Co., maker of gas and oil engines and contractors' equipment, has awarded contracts for the erection of a two-story reinforced concrete and brick shop addition, 50 x 100 ft., at Clinton and Mineral Streets. Frank F. Hase is secretary-treasurer.

The Kiel Woodenware Co., Kiel, Wis., has engaged the Thomas S. Watson Co., Majestic Building, Milwaukee, to design improvements and additions to its steam generating plant. Estimates are not yet available.

The Kieckhefer Box Co., Milwaukee, which is executing large contracts for munition containers and other Government supplies, will erect a one-story addition, 190.6 x 217 ft., of reinforced concrete and brick, costing about \$50,000. John W. Kieckhefer is president and general manager.

H. E. Welbourne, 662 Seventy-second Avenue, West Allis, has organized the Pioneer Mfg. Co., to manufacture molding machines and other mechanical appliances. A new plant will be erected at Sixty-seventh and Greenfield avenues early in 1918. Plans have not yet been prepared.

Mayer Bros., Antigo, Wis., who purchased the plants of the Pioneer Iron Works and International Hoist Co. about two years ago, and have been specializing in the manufacture of power hammers, have incorporated under the name of Mayer Brothers, Inc., with an authorized capital stock of \$25,000. The incorporators are Louis and Lorenz L. Mayer and W. J. Evenson.

The Oshkosh Gas Light Co., Oshkosh, Wis., has engaged William Baehr, consulting engineer, 122 South Michigan Avenue, Chicago, to prepare plans for an electric light plant addition, 90 x 100 ft. William Wallen is general manager.

Edward Aylward, Neenah, Wis., has plans for a new gray iron foundry, 60 x 75 ft., to cost about \$15,000 complete.

The Terra Fuel & Machinery Co., Superior, Wis., has been incorporated with a capital stock of \$100,000 to manufacture machinery which will produce a fuel from ordinary clay under process discovered by Gustaf Engelbrekt, who with Theodore Meronk and F. J. Christopher, are promoting the new company. The machines are to be sold outright or on a royalty basis. Definite plans for building the machines are now being made.

The Ashland Light, Power & Street Railway Co., Ashland, Wis., will erect a 1200-hp. hydroelectric plant on the falls at the mouth of the Montreal River northwest of Hurley, Wis., on the Wisconsin-Michigan State line. The installation will cost about \$100,000. The company owns hydroelectric plants at White River and Mellen, Wis., and has a steam generating plant in Ashland.

The United States Switch Co., Eau Claire, Wis., has closed contracts for a complete forge-shop equipment in Chicago and expects delivery within two or three weeks. The former plant of the Eau Claire Mfg. Co., which has moved into its new shops, is being made ready for the company and it is likely that operations may be put under way by Nov. 1. Shepherd automatic railroad and street railroad switches and Hubbard automatic switch locks will be manufactured.

Detroit

DETROIT, Oct. 1.

War contracts have stimulated the machine-tool business in this district. It is estimated that Detroit is now doing a war business of more than \$250,000,000 in motor trucks, air-craft and munitions. Alonzo P. Ewing, newly appointed general manager of the Michigan Copper & Brass Works, states that the Government is about to let contracts for 40,000,000 rounds of ammunition, a large proportion of the metal for which will probably be rolled in this city.

Deliveries on milling machines, grinders and some lines of drilling machines are falling further behind, but those on standard lathes have improved.

More than 40 local manufacturing firms are bidding or intend to bid on Army and Navy supplies and it is expected that the results will stimulate the machine tool market.

Skilled mechanics are difficult to obtain. Wages are high and no labor trouble is anticipated.

The Packard Motor Car Co. is reported to have received another large order for trucks and passenger cars. The Lincoln Motor Co., headed by Henry M. Leland and his son, Wilford C. Leland, who formerly managed the Cadillac Motor Car Co., is reported to have spent more than \$500,000 for a site for a new plant. Large orders have been placed for machine tools and approximately \$5,000,000 is invested in the new works.

The Jordan & Steele Mfg. Co. is moving from Hastings, Mich., to its new factory at Charlotte, Mich.

The Air-O-Flex Automobile Corporation, Detroit, announces that in addition to the manufacture of 1½-ton trucks, it plans to manufacture a newly patented Air-O-Flex suspension cylinder. G. M. Walker, Jr., is president.

The plant of the Continental Motors Corporation, Muskegon, Mich., will shortly begin manufacturing two sizes of truck motors, designed according to standardized Government specifications. Benjamin F. Tobin, Detroit, is president.

The Fisher Body Corporation, Detroit, has let a contract for a one-story steel factory, 190 x 560 x 23 ft., for its aeroplane division, to cost \$200,000.

The Chalmers Motor Co., Detroit, will be operated under the name it has borne for several years and not as a member of the Maxwell Motor Co., which recently took over the organization and plants of the Chalmers company.

The Victor Wire Wheel Co., Kalamazoo, Mich., which is being financed by the industrial committee of the Chamber of Commerce, has nearly completed a new plant.

The Essex Motors Co., Detroit, has been formed by members of the Hudson Motor Car organization, with a paid-in capital of \$500,000, and will build a car which will not compete with the Hudson models. W. J. McAneeny is president; R. B. Jackson, vice-president; A. Barit, treasurer, and J. L. Vette, secretary. Roy D. Chapin, president of the Hudson company, is on the board of directors.

The F. W. French Lumber Co., Lansing, Mich., which has branch mills in many parts of the country, has purchased 10 acres in Lansing and will begin at once the erection of a saw mill, veneer works and handle factory.

The American Car & Foundry Co., Detroit, has closed a contract with the Government for 6500 artillery vehicles, amounting to \$6,000,000. The order is additional to 10,000 already contracted for, all of which are being manufactured in Detroit.

The Belding Machine Co., Belding, Mich., has been organized with \$25,000 capital to manufacture tractors and do general machine work. Henry Upholt heads the company.

The Burroughs Adding Machine Co., has let a contract for a two-story brick and steel power house at Third and York avenues, Detroit.

Cleveland

CLEVELAND, Oct. 1.

The demand for machinery to manufacture motor truck parts and airplane motors has been very heavy the past week. The Standard Parts Co., Cleveland, has purchased more than \$260,000 worth of equipment for its various works, the bulk being for extensions to its Cleveland Axle plant, Canton, Ohio. The Nurdyke-Marmon Co. is placing orders for a large amount of machinery for the manufacture of Liberty motors, and will also purchase about \$100,000 worth of turret lathes. Inquiries from the General Electric Co. and the Erie Forge Co. for their Erie, Pa., plants aggregate about \$4,000,000. The latter company, among other equipment, wants 60 boring and turning lathes up to 48 in. for rough boring and turning guns. The list of the General Electric Co. includes a large amount of heavy machinery for Government turbine work, and aggregates about \$2,500,000. It is understood that both companies are having considerable trouble in getting machinery for the deliveries wanted. The Worthington Pump & Machinery Corporation has purchased about 30 screw machines from a local manufacturer, and in addition has bought other machine tool equipment. The Templars Motor Co., Cleveland, has purchased about \$7,000 worth of equipment for use in assembling automobiles. The demand for turret lathes is very heavy and one manufacturer reports its September business larger than any of the previous three or four months. There is a good volume of scattered buying of various types of machines in small lots.

The Standard Parts Co., Cleveland, will enlarge its Cleveland Axle plant in Canton, Ohio, and has purchased two 7000-lb., two 5000-lb. and two 3000-lb. hammers, six trimming presses, lathes, milling machines and other machine tool equipment, and will rebuild the plant boiler house and

install new boilers. This company will also make extensions to its Hess-Pontiac Spring & Axle plant, Pontiac, Mich., expending about \$45,000 for building extensions and \$10,000 for equipment. In Toledo it is enlarging its Bock-Bearing plant with an addition of 100 x 225 ft. at an expense of \$175,000 and will add about \$50,000 in equipment, including special machinery and boiler plant equipment. Its American Ball Bearing plant in Cleveland will be enlarged by the addition of about \$50,000 in equipment which will, for the most part, be special machinery.

The Glen. L. Martin Co., Cleveland, recently organized to manufacture airplanes, has elected the following officers: President, C. E. Thompson, president Steel Products Co.; vice-president and general manager, Glen L. Martin; treasurer, S. L. Mather; secretary, C. M. Osborne. In addition to the officers the directors include W. G. Mather, Charles W. Bingham, M. B. Johnson, Alva Bradley and W. D. Turner.

The Browning Co., Cleveland, will shortly place in operation a new foundry in connection with its Mansfield, Ohio, plant.

The Fairmount Tool & Forging Co., Cleveland, has been incorporated with a capital stock of \$100,000 by Albert R. Homans and H. O. Gibson, who will be financially interested in the company, and others who will be more active in the management but whose names have not yet been made public. It contemplates acquiring an existing building and to manufacture small forged tools.

Corrigan, McKinney & Co., Cleveland, will build a one-story service building, 32 x 98 ft.

A. P. Schraner will build a two-story pattern shop on Payne Avenue, near East Thirty-third Street, Cleveland, and will purchase some equipment.

The Massillon Foundry & Machine Co., Massillon, Ohio, has placed its new plant on Columbia Heights in partial operation and will gradually move the remainder of its equipment from its old plant to the new quarters.

The Automatic Signal & Sign Co., 409 Rex Avenue, Canton, Ohio, has been incorporated with a capital stock of \$10,000 to manufacture signals. P. G. Myers is president and John A. Wertz, secretary-treasurer.

The H. L. Hirsch Mfg. Co., maker of spraying machines, will move its plant from Canton to Greenwich, Ohio, where a new factory, 50 x 200 ft., will be erected.

The Engel Aircraft Co. has taken possession of the plant of the Niles Car & Mfg. Co., Niles, Ohio, upon which it recently secured an option, and will build airplanes. It has a capital stock of \$3,000,000. The officers are H. D. Baker, Cleveland, president; A. J. Engel, vice-president and production engineer, and George S. Patterson, treasurer.

The plant of the Humphrey Pipe & Foundry Co., Bellefontaine, Ohio, consisting of three buildings, one of which is occupied by the Kauffman Metal Parts Co., has been purchased by James L. Simpson, Lima, Ohio.

The Defiance Screw Machine Products Co., Defiance, Ohio, has placed a contract with the Toledo Bridge & Crane Co. for the erection of two additional stories on a factory, 50 x 125 ft., built last year.

The Mansfield Pattern Works, Mansfield, Ohio, of which W. J. Neidhart is proprietor, will erect a new two-story plant.

Cincinnati

CINCINNATI, Oct. 1.

A few munitions contracts have recently been quietly booked by local manufacturers. Some of these are sublet, but at least one of importance was placed by the Government direct.

Orders for machine tools are still coming from ship-building firms, airplane makers, as well as from the steel mills. The export business is by no means dead, and quite a number of machines are being built for shipment to France. A few of these are for the French Government, but the majority are destined for repair shops that will be maintained by the American Government. Spain continues to take a few small machines.

The local labor supply is fairly satisfactory. The Niles Tool Works Co., Hamilton, Ohio, has not yet obtained a permanent injunction against the labor unions interfering with Government work that it has in hand, but a decision is expected at an early date. The foundry, which is the only branch affected, is still being operated with a reduced force.

The American Tool Works Co., Cincinnati, advises that about 95 per cent of its equipment has been removed to its new plant on Pearl Street, and that the remainder will be installed before the end of the year.

The new plant of the Steel Forging Co., Oakley-Cincinnati,

is now in operation. The offices are in the Bell Block Building, Cincinnati.

Further plans of the National Lead Co., Cincinnati, whose proposed improvements were recently noted, include a large power plant.

Breese Brothers, Cincinnati, roofing manufacturers and contractors, are reported to have plans completed for a new plant to be erected on Reading Road, in the Mount Auburn district. Details are not yet available.

The Government is fitting up a repair shop at the Wilbur Wright Aviation Field, Dayton, Ohio. Nearly all the necessary equipment has been installed.

The Robbins & Myers Co., Springfield, Ohio, is increasing its facilities by installing a branch plant in the Shipyard Factories Building.

Springfield, Ohio, will open bids Oct. 10 for an 18-in. x 10-ft. engine lathe.

The Wagner Engineering Co., F. A. Wagner, president, Dayton, Ohio, has recently been organized to manufacture cast-iron gears. It advises that it has a process whereby gears can be cast true to pitch and require no machining.

The McCallip Mfg. Co., Columbus, Ohio, has been incorporated with \$25,000 capital stock by Wright McCallip and others. The company was formed to continue the business of the late W. W. McCallip and its principal products are wire work and special wire working machinery. Very little extra equipment will be required.

The W. E. Lamneck Co., Columbus, has increased its capital stock from \$100,000 to \$140,000. No immediate extensions to its furnace fittings plant are contemplated.

The Ohio Tool Co., Columbus, has sold its plant at Charleston, W. Va., and has also disposed of its Columbus factory. The tool manufacturing business will be discontinued.

The J. C. Hearn Machine Works Co., Columbus, has awarded contract for rebuilding its plant recently destroyed by fire. The new shop will be 100 x 150 ft., two stories, of brick and concrete. The company makes a specialty of dies, jigs and machine shop specialties.

The McIntyre Mfg. Co., Columbus, maker of farm tractors, is reported to have plans under way for still further extensions to its plant.

The Baltimore & Ohio Railroad Co. is reported to have made arrangements for the construction of a 12-stall roundhouse at Wellston, Ohio, and a small repair shop.

The S. H. Thomson Mfg. Co., Dayton, has increased its capital stock from \$10,000 to \$25,000 to take care of the manufacture of a new electrolytic oxy-hydrogen gas generator. Its plant is in the Beaver Power Building.

The Cincinnati Electrical Tool Co., Cincinnati, has removed its machinery from its former location on Evans Street to 1501-1505 Freeman Avenue. The company is increasing its capacity.

Indianapolis

INDIANAPOLIS, Oct. 1.

The General Electric Co., Fort Wayne, Ind., is taking bids for the erection of a six-story brick and concrete addition, 80 x 160 ft. Harris & Richards, Philadelphia, are the architects.

The International Airship Corporation, Gary, Ind., has taken bids for the construction of a new one-story plant, 100 x 500 ft., at Miller, Ind., to cost about \$500,000. Offices of the company are at 36 South State Street, Chicago.

The American Car & Foundry Co., Indianapolis, Ind., has commenced the erection of a new foundry on Kentucky Avenue, to cost about \$6,500.

Oscar Fox & Co., Fort Wayne, have purchased the Kunkle Valve Works. William Bostick, who has conducted the business since the death of his former partner, William Kunkle, will retire.

The Werra Aluminum Co., South Bend, Ind., has let contract for an addition to its plant.

The Central South

LOUISVILLE, Oct. 1.

Local inquiries for tools and motors continue to increase. The uncertain supply of coal is causing considerable anxiety to manufacturers in this district. Skilled labor in metal working plants is scarce and difficult to obtain.

The Roy C. Whayne Supply Co., Louisville, is in the market for a 9 x 12 or a 10 x 12-in. double-cylinder, double-drum hoisting engine without boiler, and also a single-drum hoist of similar size, both second-hand in good condition.

The Jonesboro Mills, Jonesboro, Tenn., is in the market for a second-hand vertical or horizontal boiler of 35 to 50 hp.

The Knoxville Ice & Cold Storage Co., Knoxville, Tenn., has been incorporated with capital stock of \$70,000 by W. R. Griffin, J. P. Roddy, R. H. Gallaher, and others, and will establish a cold storage and ice manufacturing plant.

The William J. Oliver Plow Co., Knoxville, has been incorporated with a capital of \$200,000 to manufacture plows and agricultural implements. S. C. House, Asa Hazen and H. E. Armstrong are the incorporators.

The R. S. Hill Co., Louisville, manufacturer of organs, is reported to be planning for the erection of an addition to manufacture airplanes.

J. M. Riley, Williamstown, Ky., is in the market for a second-hand oil engine of 25 or 30 hp.

St. Louis

ST. LOUIS, Oct. 1.

Boyd & Alexander, Jonesville, Miss., will equip a public service electric light and power plant and are in the market for machinery.

Additional equipment to cost about \$12,000 will be installed in the power plant at Lumberton, Miss., under the direction of X. A. Kramer, Magnolia, Miss., engineer.

Scobba, Miss., W. S. Carter, clerk, is in the market for about \$3,000 worth of electric light plant equipment.

The Armour Car Works, Meridian, Miss., will install equipment to increase the capacity of the plant.

The American Tank Co., Cushing, Okla., has added \$40,000 to its capital to purchase additional equipment for its plant.

The Oklahoma Gas Generator Co., Oklahoma City, Okla., has been organized by E. H. Carter, E. E. Blake and E. A. Wales to manufacture gas generators.

The Atlas Welding & Cutting Co., St. Louis, Frank J. Boher, Q. W. Morrison and J. Podmorski interested, will equip a plant for metal welding and cutting operations.

New Orleans, La., will equip a triple section dehydrating, utilization and incinerating plant to cost about \$1,250,000. Thomas S. Willis, engineer, is in charge of the work.

The Thompson Fountain Brush Mfg. Co., Kansas City, Mo., has been organized with a capital stock of \$60,000 by C. L. Horning, F. H. Denise, and others, to manufacture fountain brushes.

The Fortier Electric Mfg. Co., Tulsa, Okla., has been organized with \$50,000 capital to manufacture electric fixtures.

The Automatic Fender & Sales Co., St. Louis, has been organized by Ernest Schober, Walter W. Simpson, and others, to manufacture automatic automobile fenders.

The Vicksburg, Shreveport & Pacific Railroad, Monroe, La., L. B. Berelle, supervisor, will build a 7-stall round house and machine shop, and install electrically driven cranes, locomotive hoist, etc., to cost about \$100,000.

Texarkana, Ark., and Texarkana, Tex., will unite in the construction of a sewage disposal plant to cost in excess of \$100,000.

The Natchez Mfg. Co., succeeding the Natchez Cotton Mills, will install electric drive in the plant, and is in the market for motors.

The plant of the Triangle Milling Co., North Kansas City, Mo., has been burned with a loss of \$80,000 on equipment, which will be replaced.

O. L. Collins & Son, Bank of Commerce Building, St. Louis, are reported in the market for a 100-kw. generating unit for isolated operation.

The Russell Carriage Co., Kansas City, Mo., has purchased a site for the erection of a plant to cost \$30,000 to manufacture bodies for passenger automobiles. Frank T. Russell is head of the company.

The Copper Clad Malleable Range Co., St. Louis, Loyd Scruggs, president, will erect furnaces for rust-proofing and black finishing its ranges by the Swan process. Contracts for use of the patents of the Rust Resisting Black Finish Co., Bridgeport, have been closed.

The Mueck Auto Body Co., West Papin Street, St. Louis, has been incorporated with a capital of \$30,000 to manufacture automobile pleasure and truck bodies, and wheels. Frank W. Mueck is president and W. Happell vice-president.

The B-B Mfg. & Drilling Co., Kansas City, Mo., has been incorporated in Delaware with capital of \$500,000 to manufacture drills, bits, etc. Samuel J. Matthews, Edward L. Scott and A. M. Davis, all of Kansas City, and H. U. Bartlett, Sapulpa, Okla., are the incorporators.

The Alabama Drydock & Shipbuilding Co., Mobile, Ala., will increase the capacity of its plant. Contract has recently been awarded for the construction of two new shipways and auxiliary structures.

The Henderson Shipbuilding Co., Mobile, has recently been incorporated with a capital of \$250,000 to build submarine chasers in a plant on Pinto Island. Frank Henderson is president, and W. T. Henderson, vice-president and treasurer.

Texas

AUSTIN, Sept. 29.

The demand for irrigation pumping plants and equipment is unusually heavy, many orders having been received within the last few days from Mexico.

The Dallas Power & Light Co., Dallas, has been incorporated with a capital stock of \$150,000. The principal stockholder is Harry M. Durning of New York. Other incorporators are J. F. Strickland, W. D. Head and C. F. Calder, Dallas.

The City Commission, Beeville, has awarded the contract to John S. Fenner for a municipal electric light plant.

The Port Lavaca Channel & Dock Co., Port Lavaca, will construct docks and install facilities for loading and unloading ships.

The Farmers Gin Company, Enloe, will build a cotton gin to cost \$16,000. W. L. Dewitt is a stockholder.

F. C. Johnstone, Houston, and Henry Piaggio, Gulfport, Miss., have acquired the foundry of R. P. Clark & Co., Houston, and incorporated the International Marine Iron Works. It is stated that the foundry will be enlarged and equipped to construct marine engines and other machinery for the shipbuilding company, of which Mr. Piaggio is at the head.

The Dallas Southwestern Traction Co. has been granted a franchise to construct an interurban electric railway from Dallas to Irving, a distance of eight miles, which will ultimately be extended to Cleburne, 60 miles.

The Island Transportation Co., Tampico, Mexico, which has been incorporated with a capital stock of \$30,000,000, will build an oil refinery and a system of pipe lines. D. A. Ketchum, Charleston, W. Va., is interested.

The Sinclair Gulf Corporation will award the contract soon for the construction of an oil refinery at Houston to cost about \$2,000,000. The survey for the plant is now being made. An 8-in. pipe line will be laid from Damon Mound to the refinery.

California

LOS ANGELES, Sept. 25.

The new plant to be constructed by the Cochise Machine Co., Los Angeles, will manufacture air drills and kindred equipment. It has secured a five-acre tract at Broadway and 115th Street and proposes to build extensive works. Contract for the first unit, comprising a machine shop, foundry and forge shop, has been awarded.

The Lilly-Fletcher Co., Los Angeles, has been incorporated with a capital of \$20,000 to erect a shipbuilding plant. About five acres on the Wilmington Basin, Los Angeles Harbor, have been acquired. J. B. Lilly, P. B. Fletcher, C. R. Edwards and W. LeRoy Thomas, all of Los Angeles, are the incorporators.

Sudden & Christenson, shipbuilders, San Francisco, have organized the National Shipbuilding Co. to build a shipyard at San Pedro Harbor, Los Angeles. A site has been secured on the East Basin.

The Braun Corporation, 371 New High Street, Los Angeles, manufacturer of assayers' supplies, ore crushers, etc., will erect a new one-story plant, 30 x 115 ft., on East Ninth Street.

The Eby Machinery Co., Los Angeles, removed its offices Oct. 1 from the Central Building to 438 East Third Street. L. M. Meade is manager.

The Universal Electric Connector Co., Los Angeles, has been incorporated with a capital of \$20,000 to manufacture electric specialties. L. O. Lieber, R. C. Hamlin and H. G. Holabird, Los Angeles, and R. H. Holabird, Berkeley, are the incorporators.

The Community Mfg. Co., Merritt Building, Los Angeles, has acquired about 20 acres at Burbank and contemplate the erection of a plant to manufacture motor trucks and farm tractors. The initial works will consist of machine shop, forge shop, foundry, assembling plant and office structures. E. G. Judah is president.

The Southern California Edison Co., 120 East Fourth Street, Los Angeles, has been granted permission to build a

new electric power plant on the Kern River to cost about \$4,118,000. It will have a total capacity of 30,000 kw.

The Pacific Northwest

SEATTLE, WASH., Sept. 25.

The McAteer Shipbuilding Co. and the National Steel Construction Co., Seattle, have been jointly awarded contract for the construction of a 1200-ton steel ship for the Government, to cost \$250,000. The McAteer plant formerly built wooden ships, and a number of new buildings will be erected to convert it into a steel shipbuilding plant, including a two-story boiler shop, 60 x 250 ft., and blacksmith shop. Engines for the vessel will be built in Seattle.

The Supple & Ballin Shipbuilding Co., Portland, will erect a one-story blacksmith shop, and a dock costing \$15,000.

T. T. Parker, Portland, plans the establishment of a factory for the manufacture of ship knees for wooden vessels.

The Union Timber & Products Co., Seattle, Wash., has closed contracts for several wooden vessels and work will start at once on its proposed shipbuilding plant at Port Townsend.

The Crandell & Miller Machine Shop, Eugene, Ore., has been moved to Harrisburg, Ore., where new machinery will be installed.

Two additional sections will be added to the roundhouse of the Spokane, Portland & Seattle Railway at Vancouver, Wash., making eight additional engine stalls. One section of the roundhouse will be constructed as a boiler shop and equipped with the latest machinery. John Dickson is superintendent.

The F. S. Lang Mfg. Co., Seattle, stove manufacturer, has recently completed the construction of an addition to its plant and will manufacture portable kitchen outfits for use in the army.

The Mine Machinery Mfg. Co., Seattle, has been incorporated for \$100,000 by J. W. Cover and J. R. McKeand to manufacture mine equipment.

The International Shipbuilding Co., St. Helens, Ore., has been incorporated, and will establish a shipyard near that city to build wooden vessels. A machine shop is included in the plans.

Star Machinery, Seattle, recently leased a large tract adjoining its plant on 1731 First Avenue, which it will use to extend operations and provide storage buildings and trackage. Heavy equipment including cranes will be installed. The company specializes in rebuilding machinery.

The Puget Sound Machinery Depot, Seattle, has purchased three acres of land at First Avenue South and Spokane Street, where, it is reported, a plant will be built in the near future. The company occupies leased land and has outgrown its present quarters.

The Elliott Bay Shipbuilding Co., Seattle, has received contracts for several full-powered, ocean-going wooden motor ships for Atlantic coast interests, to cost \$1,500,000, which will keep the plant busy for two years. The company was recently incorporated for \$250,000, and is a reorganization of the Elliott Bay Yacht & Engine Co. C. O. Morrow is president.

The Christopherson Airplane Co., Seattle, Wash., has been incorporated with capital of \$500,000 by Otto H. Oppermann, Willis R. Lebo and Edgar C. Snyder.

The Paterson-MacDonald Corporation, Seattle, has bought the machine shop and boiler equipment of the Shand & Marcus Iron Works, Salem, Ore., which it is moving to the Seattle plant.

The Murphy Timber Co., Portland, will erect a mill near St. Helens, Ore., with a daily capacity of 1,000,000 ft.

The Hawley Pulp & Paper Co., Oregon City, Ore., will erect a pulp mill at a cost of \$20,000.

Canada

TORONTO, Oct. 1.

Additions are being made to the plant of the West Lorne Motors, Ltd., West Lorne, Ont. New machinery will be installed as soon as the extensions are completed.

The Simonds Canada Saw Co., Montreal, will make additions to its plant and install new equipment to cost \$5,000.

The Imperial Munitions Board, Royal Bank Building, Toronto, has commenced the erection of a building on Wallace Avenue for the construction of aeroplanes, which will give employment to 250 workmen.

The Hesscot Electric Mfg. Co., 210 Adelaide Street West,

Toronto, has completed arrangements for the erection of a plant at Tilbury, Ont., to cost \$100,000.

A new company in which Senator Lyman A. Holmes, president of the Romeo Founders Co., Port Huron, is interested, will commence construction of a plant to cost \$200,000 at Sarnia, Ont., for the manufacture of automobile parts, etc.

It is reported that representatives of the Ford Motor Co. of Canada are looking for a site at St. Thomas, Ont., where it proposes to build a plant to manufacture tractors.

The Massey-Harris Co., Brantford, Ont., manufacturer of farm implements, etc., will build an addition to its plant estimated to cost \$50,000.

Commissioner Freeman of Lethbridge, Alberta, announces that a steam turbine and generator will have to be purchased without delay to provide power for the increasing load. The new unit will cost \$50,000.

C. B. Oliver, Salt Lake City, Utah, who represents the United Filters Co., American Filter Co. and Kelly Filter Press Co., is contemplating the establishing of a plant in the vicinity of Vancouver, B. C., to manufacture filters, or to arrange with some existing machine shop to extend its plant to manufacture the filters.

The Hosmer Stamping & Die Works, Ltd., 831 Dundas Street, Toronto, is in the market for a power press.

The Town Council, Aylmer, Ont., will purchase electrical transmission equipment, motor-driven pumps, etc. D. C. Davis is clerk.

The Tonsmore Truck Co., Ltd., Windsor, Ont., has been incorporated with a capital stock of \$100,000 by Edmond D. Girardot, Charles A. Smith, James B. McLeod and others to manufacture automobiles, trucks, accessories, etc.

F. G. Morris, Ltd., Hamilton, has been incorporated with a capital stock of \$100,000 by Frederick G. Morris, George W. MacNeill, Thomas R. Sloan and others to manufacture automobiles, trucks, accessories, engines, etc.

The International Harvester Co. of Canada, Ltd., Hamilton, has increased its capital stock from \$1,000,000 to \$15,000,000.

The Kerr Engine Co., Ltd., Walkerville, Ont., manufacturer of valves, has leased its iron foundry department to the Standard Foundry & Supply Co., which will supply the Kerr company with all its gray iron castings.

The equipment for the pumping plant at Three Rivers, Que., will consist of three motor-driven centrifugal pumps with provision for one or two gasoline engine-driven pumps. R. S. & W. S. Lea of Montreal are the engineers.

Walter and Charles McNeil are preparing plans for the erection of a shipyard at New Glasgow, N. S., where wooden ships will be built.

The factory of Gold Metal Furniture Co., Gunnell and Henry Streets, Winnipeg, recently destroyed by fire with a loss of \$50,000, will be rebuilt and new equipment will be purchased.

Eugene Gagne will start work immediately on the erection of a hydroelectric plant at Metabetchouan, Que., to cost \$40,000. J. A. Claveau, Chicoutimi, Que., is engineer.

The A. R. Whittall Canadian Co., Ltd., 740 Mullins Street, Montreal, is in the market for motors and shafting in connection with the addition to its plant for the manufacture of cans, etc.

The Allied Truck Co., Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by John G. Baukat, 21 Sussex Avenue; Charles E. A. Carr, 2 Toronto Street; Frederick W. Burrows, and others, to manufacture motor trucks, automobile engines, motors, etc.

Chapleau Township, Ont., will build an addition to its pumping station and install an electrically-operated pumping unit to cost \$6,000.

The Oliver Chilled Plow Works, Hamilton, is in the market for an 18-ft., 300-hp. Heine water tube boiler, 150 lb. pressure, 3½-in. tubes.

The Newfoundland Shipbuilding Co., Harbor Grace, Newfoundland, has had plans prepared by G. F. Payling & Co., 1438 South Penn Square, Philadelphia, Pa., for the erection of a shipbuilding plant at Harbor Grace, to cost \$500,000.

The plant of the Welland Machine & Foundries, Ltd., Welland, Ont., was damaged by fire Sept. 22 with a loss of \$2,000.

Albert Kleiser & Co., Ltd., Toronto, has been incorporated with a capital stock of \$150,000 by Rousseau Kleiser, 6 Wellington Street East, Toronto; William G. Lacy, Alfred W. Frogley and others, to manufacture jewelry, clocks, tools, etc.

The British Columbia Construction & Engineering Co., New Westminster, B. C., will establish shipyards on Poplar Island and build four steamers for the British Munitions Board at a cost of \$1,400,000.

